RAILROAD GAZETTE

FRIDAY, MAY 30.

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## Contributions.

### Working Railroads by Electricity.

*Pennsylvania Railroad Co.,*
ALTOONA, Pa., May 24, 1890.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Your criticism on page 364 of the issue of May 23, 1890, on the article "Working of Railroads by Electricity," read at the recent meeting of American Society of Mechanical Engineers, does not quote exactly the words which were used when mentioning the degree of variation of train resistances due to different speeds. If you will refer to that paper, you will find the words: "The resistance of trains is now quite positively known to increase *about* with the square of the velocity." While the words are placed in a way that is apt to lead to misconstruction, the conditional meaning was intended to convey the idea that from all the information obtainable, experimental and not mathematical, the resistance of trains was found to increase in some constant degree with the square of the velocity. There is considerable diversity of opinion as to what is the proportionate increase, but all the experiments so far made, and the results of which it has been possible to reach, have led to the conclusion that it is some function of the square of the velocity.

If you can say positively just what can be considered as the resistance per ton for different velocities and loads, and results by which you would not hesitate to be guided, however important and extensive the decision involved, it is not unlikely there will be more than one person who would receive such information with gratification, and prize it accordingly.

W. E. HALL.

### Publishing Time Tables.

ROCHESTER, N. Y., May 20, 1889.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Last Friday must have been one of the days on which your heart was particularly soft toward railroad officers, if one may judge by the gentle terms in which you admonished them concerning their outrageous carelessness in the matter of publishing time tables. The "average railroad man," if he has anything to do with the operating or the passenger departments, *does* understand that the traveling public have to endure a great many annoyances in consequence of his lazy way of issuing new time tables. He understands, but he doesn't care. He has no fear of confusion on the part of the passengers. All the superintendent fears is excess of activity in his own brain if he should be compelled to finish his time tables a week beforehand instead of spending all the valuable time, up to within 48 hours of the date on which it is issued, in haggling with connections to secure some small advantage.

You say that the roads gain nothing by the delay. This is not strictly true. They frequently gain $500 or $1,000, which would otherwise be spent in printing new tables, changing advertisements in newspapers and the other expenses incident to a second change. By postponing the announcement of the alterations until the latest possible date, there is, if due care be observed, more chance to eliminate errors and adjust conflicting interests than if a rigid date be fixed. But what is $1,000 compared with the inconvenience to the public? It is no more than right that the public should have seasonable notice, and the railroad officers ought, moreover, to overhaul the hotels and other public places where their time tables are posted. It is not by any means an unheard-of thing to see an old out-of-date poster in a railroad station; but in hotel reading rooms and other places where no direct authority is in force the duty of keeping posters corrected to date is attended to by no one, and deceptive advertisements are more numerous than correct ones; and it would be about as well, in fact often better, if time-tables were not posted in such places No careful man dares to use them, and so must always go to the clerk for his information. Railroads ought also to be compelled to send their time tables to connecting lines much more systematically. The least that they could do would be to have an arrangement between lines by which a road making a change and lacking the time for preparing new posters and folders, and for sending them to the ticket offices of all connections, should send a telegraphic or other preliminary notice requesting old issues to be covered or destroyed. Being a railroad man, I can see, however, that the enforcement of such a regulation would depend upon the persistency with which the public demanded it. Tariffs are not properly posted, in spite of a positive law on the subject. But time tables are of more immediate interest to the patrons of railroads than tariffs are, and it may be hoped that travelers would follow up the railroads closely enough to compel them to take more pains with tables than they do with tariffs, which serve only as collectors of fly specks.

"OLD SUBSCRIBER."

### Necessity of Two Lookout-Men on Engines.

PATERSON, N. J., May 24, 1890.

TO THE EDITOR OF THE RAILROAD GAZETTE:

There is a new danger in railroad service which has been spreading of late years, but which does not receive the attention it deserves. I refer to the use of the side cab on the modern heavy engines, in which the engineer and fireman are separated so that they cannot conveniently communicate with each other. There are dangers enough to engineers and firemen, as well as to the passengers who ride on trains, from the familiar causes which have sent so many people to their deaths in past years. One would suppose that this alone would be enough to lead to the use of every possible safeguard. In addition to this there is the danger of sickness and sudden death. People drop down dead in the street, in the house and, in fact, everywhere. Locomotive runners are liable to this, the same as other people, and if they are to be entrusted with the lives and property on a railroad train without any provision against this contingency, the new cabs are dangerous innovations. Not long ago an engineer dropped dead in the cab of his locomotive just as he was getting ready to start out. Last December a freight train on the New York, Susquehanna & Western plunged through an open drawbridge at Little Ferry, N. J., killing three men. The only plausible explanation of this disaster is that William Nixon, the engineer, must have been dead before he reached the signal. He was an experienced and careful man, and it is hardly imaginable that he would have thus run at uncontrollable speed if he had been alive and in his right mind. There was some testimony at the inquest tending to show that his death took place before he reached the water. The cab on this engine was one of the side cabs, the boiler running right through the centre and dividing it into two parts. The men are indeed only six feet apart, but there is a door between them, and either man, if he desires to speak to the other, must lean around the door jamb. In some of the new culm burners the cab is placed on top of the boiler, only about 6 ft. from the smoke stack, and the fireman in his separate cab is 16 ft. away from the engineer. There are two doors between the men instead of one as in the other case. In these engines there are separate steam and water gauges for the two men, and in some of them there is a speaking tube, so that the men can shout back and forth. These facilities make it practicable to carry on their routine duties all right, but in case of emergency—a danger signal ahead which can be seen better from one side of the engine than from the other, or the momentary mental disability of the engineer, which all scientists, who have discussed the subject, regard as a danger to which there is a real and constant, though perhaps small, liability—the speaking tube is liable to be worthless. On freight trains there is a brakeman in the cab a portion of the time, but on passenger trains, where the consequences of disaster would be worse, the enginemen see nothing of the trainmen during a whole trip. It seems as though any one, after considering the Little Ferry disaster and then viewing heavily loaded passenger trains rush by, as they do every few minutes during many hours of the day over the numerous drawbridges in the vicinity of New York City, and reflecting on the consequences if such a disaster should happen to a passenger train instead of a freight, should realize the critical situation in which passengers are placed when their lives are made dependent on the brittle thread of the engineer's continued life and health during the trip. It is bad enough to run the risk of a failure of memory on the part of the engineer, or of the momentary forgetfulness by which he will some times run past a switch signal which shows red. When we consider all the dangers in the aggregate, it must be admitted that to place less than two men within reach of the throttle and the air-brake valves is deliberately inviting disaster.

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### Competitive Trials of Machine Snow Plows.

*Jull Manufacturing Co. 371 Fulton Street,*
BROOKLYN, N. Y., May 24, 1890.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I have read with interest and amusement the article, published in the issue of your paper of May 23, 1890, entitled "Competitive Trials of the Rotary and other Machine Snow Plows." As might have been expected, the statements published are attributed by you to their proper source. I shall not waste time in merely contradicting the countless inexact and misleading (I avoid the use of stong adjectives) statements of Mr. Leslie, concerning the Jull Excavator and the Rotary; but shall simply analyze a few of Mr. Leslie's statements from his own point of view, and then ask your readers to apply to his testimony the familiar maxim, *falsus in uno, falsus in omnibus.*

April 16.—The two machines began their work on the morning of April 16, near Murphy's mine, which is about two mines above St. Elmo. The total distance from St. Elmo to Alpine Tunnel, according to the Union Pacific time table, is nine miles. Work was finally stopped on the evening of the 18th of April, about one mile below Alpine Tunnel, according to Mr. Leslie. Therefore the entire distance covered by both machines, during the entire three days, was six miles.

I shall assume, for the purposes of this discussion, although contrary to the fact, that the Jull Excavator accomplished nothing whatever during the entire three days. We have, then, six miles of track to be traversed: from the starting point of the machines to Hancock, four miles; from Hancock to the final stopping point, one mile below Alpine Tunnel, two miles. As far as Hancock, the snow varied in depth from 15 in. to 5 ft. beyond Hancock the snow varied in depth from 18 in. to 8 ft. (Always Mr. Leslie's figures.)

On the 16th of April, after the Jull Excavator had been retired, and the Rotary had gone about 100 yards, and had "backed out in order to examine the condition of the track," Mr. Leslie says, "the Rotary was then started ahead again, and ran 2½ miles in 13 minutes." Six miles, less 2½ miles, leaves 3½ miles of track to be cleared at the end of the first day, the Rotary having worked 13 minutes, barring the 100 yards. This brought the Rotary to a point within 1½ miles of Hancock.

April 17.—On the second day, April 17, the Jull machine was not called upon, and the Rotary had the entire field to itself, to continue its remarkably rapid work. Of this day's work Mr. Leslie says: "The next morning the Rotary was put in again and ran through three or four feet of snow at a speed of eight miles an hour. A photograph was here taken, and when the photograph was made the plow was running eight miles an hour through snow four feet deep." The Rotary passed Hancock on the 17th of April, but eactly how far, Mr. Leslie does not state.

Now we have, on the morning of the 17th, 3½ miles of track to be cleared. The Rotary was hard at work during the entire day, "running eight miles an hour through snow four feet deep" and "through from four to eight feet of snow at about four miles an hour." The duration of this rapid pace could not have been very long, else the entire 3½ miles must have been cleared almost immediately, and nothing left for the Rotary to do for the balance of the 17th and on the following day, and yet it was at work all day on the 17th and at least a half day on the 18th.

Let us be liberal and admit, say, 15 minutes of this work at eight miles per hour, and, say, 15 minutes at four miles per hour. We then have 3½ miles, less three miles equals one-half mile, still to be cleared. What in the world can the Rotary have been doing during the the balance of this long April day? Were the gentlemen devoting their time to adulations of the machine during the rest of the day? Or was Mr. Leslie whirling his wheel on a clear track?

April 18.—"The Rotary was put in at this point, and passed over the Alpine Pass, through from four to eight feet of snow, at about four miles an hour. . . . The Rotary was stopped within a mile of Alpine Tunnel, in order that the party might return to Denver that night. There was no mishap or delay during this day's trial with the Rotary." What in the world were you doing all day, Mr. Leslie? You only had half a mile to go, and advanced at the rate of four miles per hour, without "mishap or delay." At the rate of speed stated by you, seven and one half brief minutes were amply sufficient to reach the point at which you finally stopped. Was it a case of further adulations and exhibitions on a clear track?

After the graphic description of the attempt of the Jull Excavator to throw snow to the left, it is said "It was again arranged to throw the snow to the right, but after a few more futile efforts, it was derailed again." I reproduce a photograph of the Jull Excavator in operation, taken at this exact moment by Mr. Jackson, of Denver, in, Mr. Jackson says, 7 ft. depth of snow; Mr. Leslie says 18 in. The photograph speaks for itself. This is one of the "futile efforts." I could furnish several other equally good examples of our "futile efforts" to throw snow, taken at different times, upon these occasions of April 16th and 18th.

It is also entertaining to observe that, according to Mr. Leslie, whenever the Rotary went into the snow, the rails were covered with ice and the snow was deep and hard; but when the Jull Excavator was brought forward, the rails were free from ice, the snow not deep and of a lighter quality.

I have made these few suggestions, as a demonstration of the gross exaggerations and utter unreliability of the statements made by Mr. Leslie and published in your journal, and as a basis for the application of the maxim *falsus in uno, falsus in omnibus.*

I hand you herewith a copy of Mr. Jull's report to our

THE JULL EXCAVATOR IN HARD SNOW SEVEN FEET DEEP.

**company, upon the operations of the Jull Centrifugal Excavator, between St. Elmo and Alpine Tunnel, and request its publication as our affirmative answer to Mr. Leslie's published statements.**

**CHAS. H. OTIS,**
**Treasurer Jull Manufacturing Co.**

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EXTRACTS FROM MR. JULL'S REPORT.

I may premise my formal report with the statement that, if I had known in advance of the construction of this narrow gauge excavator, the character of the work which it would be called upon to execute, I should have made some material changes in some of the details of construction of this particular machine, to better adapt it to the abrupt curves of this narrow gauge road. . . . The Union Pacific Railway Co. made some slight alterations in this machine at Denver, Colo., before it was put at work in the snow. Among other things, the machine was equipped with air. . . .

While the excavator was on its way to St. Elmo, Col., near which point it was to encounter its hard work, it once became derailed, upon a clear track, and before it had encountered any snow. This occurrence, in connection with our later experiences, convinced me that our subsequent difficulty in holding the machine to the rails was not due to any defect in the principle of our device, but was solely due to a single defect of construction, which can be easily remedied. This defect, both the railroad officials in charge of the machine and I were unable to discover, until we had had larger experience with the machine; but it was subsequently determined by both them and myself that the cause of the excavator's leaving the track, either on sharp bends of the road or in other places where inequalities of the road existed, whether machine was working in snow or was simply being hauled over the track, either forward or backward, was the fact that the centre pin of the trucks was too rigid, so as not to allow a sufficient sideways motion of the weight supported by the trucks. The effect of the too snug fit of the center pins, as we subsequently discovered, was to lift the wheels of the machine on one side of the truck several inches from the track, wherever these great inequalities and irregularities of the tracks existed, so that, at these points, all the weight of the machine was being carried by one-half of the wheels intended to support it. We observed that this also occurred on some pieces of straight track as well as on sharp curves, on account of the extreme inequalities and irregularities of the track. This I believe to be the only cause of our subsequently leaving the track when at work in the snow. I do not think that our becoming derailed, even with this narrow gauge machine and on the sharp bends of this road, was caused by the projection of the hood and cone over the forward truck.

We first encountered snow a few miles above St. Elmo, on Wednesday, April 16, 1890. We were set at work, on the morning of that day, in snow which had been lying on the track all winter, and which was nearly as hard as ice, varying in depth from 2 to 4 ft. It was sufficiently hard to support men, and, as I was informed, horses and sleighs, although I saw none of these. We were placed in contact with this snow upon a very sharp curve. The machine did magnificent work, throwing out tons of snow and c earing the tracks at a rapid rate over a space of not less than 600 ft., when the machine suddenly left the track. At the time when this occurred the excavator was revolving no more rapidly than before and was in no deeper or harder snow than that which lay upon the tracks, which it had previously cleared without difficulty. I am convinced that this was due to the inequalities of the track, to which I have referred, and the impossibility of all the wheels keeping the tracks on account of the too snug fit of centre pins. I am supported in this view by all the railroad officials present, who witnessed the test, whom I have heard express an opinion upon the subject, and I may say that a very considerable number of those present did express to me an opinion upon this subject. . . .

At the time our machine left the track, as above described, we had nearly completed the rounding of the sharp curve, upon which we had been at work, so that when the Rotary was brought forward for its work, it was employed upon a comparatively straight piece of track. The depth and quality of the snow was about the same as that which we had cleared. The Rotary cleared the track well, but very slowly, over a space of from a quarter to a half mile, without other mishap than frequent stoppage, for the purpose of getting up the steam required to perform its work. And I may here say that during the cleaning of the few hundred feet by our own machine, which I have described above, we were not obliged to stop once until we left the track as I have described. Our boiler gave us no trouble in making steam, but we did experience some difficulty on account of the priming of our boiler, which was new and had never been used before. The progress which we made through the snow was very much more rapid than that which the Rotary made in the same depth of snow, and the volume of snow thrown by our excavator was much greater than that thrown by the Rotary.

Our machine threw the snow magnificently. Some notion of what we accomplished in this particular may be obtained from the photographs of the machine in operation, taken by W. H. Jackson & Co., of Denver. After the Rotary had cleared between a quarter and a half mile of a comparatively straight piece of track, having encountered but one long and easy curve, in snow about 46 in. in depth, working very slowly and with frequent stoppages to get up steam, it was taken back and side-tracked, and our excavator was brought to the front to resume the work of clearing the tracks. The snow continued of about the same depth and quality. We had not the slightest difficulty in clearing the tracks, and threw the snow at a much more rapid rate than the Rotary, nor were we once obliged to stop for the purpose of getting up steam, but continued steadily and rapidly forward, clearing the track for a space of upward of a mile, I should say. During this period of work we again encountered our former trouble and derailed four or five times Again, the conditions at times when our excavator left the track, so far as quality and depth of snow are concerned, were no different than they had previously been, and again demonstrating that the irregularities and inequalities of the tracks, combined with our too rigid centre pins, caused our excavator to leave the track, and not the snow which we encountered. The machine was again put on the track and hauled back to the nearest siding. Upon its return to the siding upon this occasion, while being hauled backwards over a clear track, the event occurred which enabled us to discover the cause of our excavator's becoming derailed. When it had reached one of the points in the track, at which it had left the rails while excavating snow, it again left the rails, and at exactly the same point. We then discovered that the wheels on one side of the rear trucks were supporting the entire weight intended to be supported by these trucks, while the wheels on the other side of the rear truck were some inches from the rail, and that this was due to the unpliability of the machine in its sideways motion, on account of the excessive tightness of the centre pins of the trucks. I think more conclusive proof could not be asked, that our derailments were not due to any inherent defect in the principle of our machine, than was furnished by the occurrence of this event. Nothing further was done with either machine on this day, it being now evening.

When our excavator stopped work on April 16 it had opened the road to a point within about half a mile of Hancock. On the morning of the 17th the Rotary was sent forward to continue the work of cleaning the road. It commenced its work in snow not exceeding 2 ft. in depth, and would have made steady but slow progress through this depth of snow but for its frequent stoppages to get up steam. The time actually consumed in clearing this half mile of track from this depth of snow until it reached Hancock, and the greater depth of snow which it there encountered, was about one hour. Before entering the deeper snow some time was consumed by the Rotary in the repair of some breakage which had occurred in one of its knives. The Rotary then pushed forward into snow of the depth of about 5½ ft. Its progress in this depth of snow was extremely slow, with frequent delays to get up steam. The Rotary had proceeded in this manner a few hundred feet, in snow varying from 3 to 5½ feet in depth, when it became derailed. It was replaced upon the track and another start made. It had proceeded but a very short distance when it was again off the track. And so it continued all day. The Rotary would clear a short piece of track very slowly and would then jump the track, so that the greater part of the afternoon was consumed in replacing it upon the track after it had become derailed. During the afternoon of April 17 the Rotary was off the track at least four times, and on one occasion its tender was also derailed.

Night having come on, the Rotary was brought back to Hancock, at which place it cleared one side track, having been derailed in so doing in snow about two feet deep on that portion of the siding where the track was perfectly straight.

On the morning of the 18th of April, 1890, our machine was hauled from its siding to the point at which the Rotary had ceased working on the previous evening, about half a mile beyond Hancock. The snow was of about the same character as that previously described and of a depth ranging from 5 to 7 feet. We commenced work at, I believe, the sharpest curve which either machine had been called upon to encounter, and in the deepest snow which either had been called upon to handle. We passed through this bank rapidly and without the slightest difficulty or delay for a distance of about 150 ft., when our machine again became derailed.

I should at this point explain in detail our attempt and failure with this narrow gauge excavator to throw the snow to the left-hand side of the machine, and the cause of its failure so to throw the snow. Before we encountered the deep snow on the sharp curve, as above described, I caused the cover to be placed upon the opening on the right-hand side of the machine, for the purpose of endeavoring to throw the snow to the left-hand side of the machine. A few seconds operation of the machine in this manner showed its inability so to throw the snow, the cause of which I will now explain. In the construction of this machine we made a very material departure in this particular from the plan of our first machine, which has this winter made such a marvelous record for itself on the O. R. & N. division of the U. P. Railway. In our first machine the interior of the hood within which the ends of our blades at the base of the cone revolve is circular, so that when the cover is placed upon the right-hand opening the circle of the interior of the hood is continued to the second opening. The ends of the blades are in contact with the interior of the hood until they have passed the closed right-hand opening and have encountered the left-hand opening. In our present machine the exterior, and at the right-hand opening; the interior of the hood is rectangular, and when it is sought to close the right-hand opening the interior surface presented, at this point, to the ends of the blade, at the base of the cone, is rectangular, and a considerable open space is left at this point between the ends of the blades and the top of the hood, so that in the revo-

lutions of the cone the snow leaves the blades, instead of continuing to be confined, and seeks to discharge itself. The right hand cover being on, the snow cannot discharge itself upon that side, and thus much of it is thrown out in front of the machine. This is very easily remedied by placing in the interior of the hood a circular gusset plate, so that the snow may be confined in the blades until the second opening is reached, thus continuing the interior circular lining as far as the left-hand opening whenever the right-hand opening is closed.

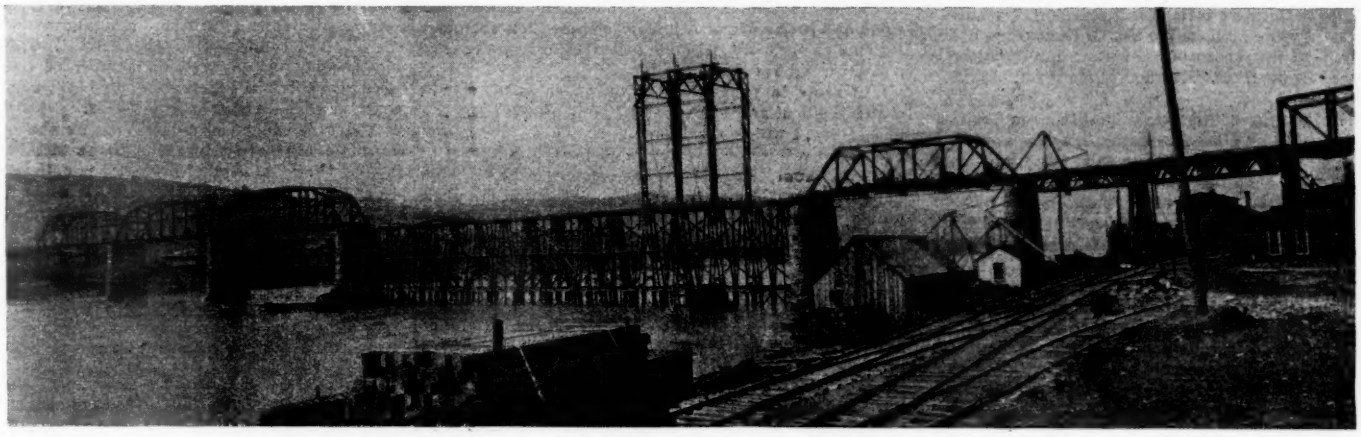
We have demonstrated beyond question that we can clear railroad tracks of any kind of snow, and of any depth not greater than the top of the hood of our machine, and that we can handle it with far greater ease and rapidity than can the Rotary; that the cause of this narrow gauge excavator leaving the rails so frequently is an oversight in the details of construction of a machine adapted to use on this extraordinary road, which can be easily remedied; that our leaving the rails as we did was not due to the general form of construction or principle of our excavator, because, on some occasions when the machine became derailed, it was derailed on the convex side of the curve and at other times on the concave side; that our failure with this machine to throw the snow to the left can be very easily remedied, as will be apparent to any one who will give the subject a single moment's reflection. A mere inspection of the photographs of the machine in operation, is the most effective report of its working.

ORANGE JULL.

## Loss of the Falsework of the Wheeling Bridge.

At about 3:30 p. m., May 25, the false work of the channel span of the Wheeling Bridge was carried away, and with it such of the superstructure as was in position. It was expected that the structure would have been erected in another week, and knowing the great skill and energy of the contractors for erection, Messrs. Baird Bros,, this is probable. We give below a letter from Mr. Job Abbott, Chief Engineer Wheeling Railway Bridge & Terminal Co., which contains most of the particulars so far known. At noon of the 25th work washed out, and it is hoped that the span will be completed in about three months."

Some further particulars are given by a local correspondent. "Baird Bros. had been rushing the work with all possible haste, and on May 1 had all the superstructure in place and fastened, except the 525 ft. channel span. At that time the contractors decided to make an unusual effort to get the channel span, which was to weigh 2,700 tons, completed and ready for trains by June 1. The falsework was completed May 11, and the work of putting up the steel began. A few days later a tow-boat knocked down part of the work. The damage was repaired, and the work was continued until last Saturday, when the rapidly rising river began to cause alarm. On Sunday morning an immense lot of driftwood had collected behind the falsework. Workmen were put to work removing the hoisting engines, rope, tackle, etc., and by noon nothing but the steel work remained in danger. At exactly 3:38 p. m. the immense mass of piles and timber began to waver, and in three minutes the structure and its load were in the bottom of the river or floating down the stream. The steamer 'Horace' was started after the wreckage, and succeeded in landing some of it a few miles below."



FALSEWORK OF THE CHANNEL SPAN OF THE WHEELING BRIDGE.

FROM A PHOTOGRAPH TAKEN MAY 17, 1890.

it became almost certain that the falsework could not be saved, and all the machinery and movable material was taken away and the connections with the channel spans were cut. The traveler was left and went down in the wreck. At three o'clock work on the drift was discontinued. We are informed from Edge Moor Works that the loss will not exceed $30,000, and that the floor system and about 20 per cent. of the lower chords (eye bars) were carried away. The span is 525 ft., double track, and about 25 per cent. heavier than any other railroad span in the country. The illustration on this page is from a photograph taken eight days before the wreck.

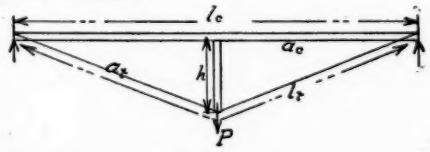
May 26 Mr. Abbott writes us as follows: "I walked over the same structure a week ago to-day, and considered it a very solid falsework, the only weak feature being the bracing between the piles, which the continued high stage of water since April 22, when piling was begun, has prevented being made as complete as was desirable. The falsework was about 90 ft. high above low water, which is only some 6 ft. in depth, and was over 40 ft. wide on top, to allow movement of traveler outside the main trusses, which were 33 ft. wide out to out. All the metalwork of floor system, with most of the lower chords and lower laterals, was in position on falsework, and they were about erecting the balance of trusses when the wash-out occurred. The river rose to over 30 ft. stage in about 24 hours, and some two acres of drift accumulated above the falsework in spite of every effort to keep it cleared, which, in connection with the strong current at this stage, was more than the falsework could sustain, owing to the height at which the drift acted against it. There were between 300 and 400 tons of metalwork on the falsework, and the loss will probably amount to $25,000, depending on the amount that can be recovered and utilized from the wreck in the river, which loss will fall on the contractors, Edge Moor Bridge Works, of Wilmington Del., constructors of the metalwork, and Baird Bros., of Pittsburgh, Penn., contractors for its erection, the work being wholly at their risk until fully completed and accepted by the Wheeling Bridge & Terminal Railroad. Steps have been already taken to duplicate the metal-

## The Strength, Stiffness, and Resilience of Iron Trussed Brake Beams.

BY PROF. J. B. JOHNSON,

*Director of Testing Laboratory, Washington University, St. Louis, Mo.*

It is very desirable that master car builders and others should have some simple formulæ for determining the strength and stiffness of trussed brake beams without actually testing them. It is the object of this article to give such formulæ.




Let $l_c$ = length of compression member.
$l_t$ = length of tension member.
$h$ = depth of truss in inches $c$ to $c$.
$a_c$ = area of solid section of compression member.
$a_t$ = area of solid section of tension member.
$w_c$ = weight per foot of compression member.
$w_t$ = weight per foot of tension member.
$P$ = load on beam.

The units of measure are inches, square inches and pounds. The length of the tension member or tie rod may be given in terms of $l_c$ and $h$ as

$$l_t = \tfrac{1}{2}\sqrt{l^2 + 4h^2} \qquad (1)$$

The total stresses in the compression and tension members are

$$\text{In compression member} = \frac{P l_c}{4h} \qquad (2)$$

$$\text{In tension member} = \frac{P l_t}{4h} \qquad (3)$$

The stresses per square inch are:

$$\text{In compression member} = \frac{P l_c}{4 a_c h} = \frac{5 P l_c}{6 w_c h} \qquad (4)$$

$$\text{In tension member} = \frac{P l_t}{4 a_t h} = \frac{5 P l_t}{6 w_t h} \qquad (5)$$

The deflection is, in terms of the cross-sections, and also in terms of the weights per foot:

$$\text{Deflection} = \frac{P}{448{,}000{,}000\, h^2}\left(\frac{l_c^3}{a_c} + \frac{l_t^3}{a_t}\right) \qquad (6)$$

$$= \frac{P}{134{,}000{,}000\ \ h^2}\left(\frac{l_c^3}{w_c} + \frac{l_t^3}{w_t}\right) \qquad (7)$$

the modulus of elasticity being taken at 28,000,000.

*Example.*—Take a beam shaped and built like the Westinghouse beam of solid flat bars, the compression bar being 2 in. × 1 in., and the tension bar 2 in. × ¾-in., and a centre depth of truss of 10 in. from $c$ to $c$ of bars. If we take the length of beam as 5 ft., or 60 in., then we would have

$l_c = 60$; $h = 10$; whence
$l_t = \frac{1}{2}\sqrt{l^2 + 4h^2} = 63\frac{1}{4}$;
$a_c = 2$; $a_t = 1\frac{1}{8}$;
$w_c = 6\frac{3}{4}$; $w_t = 2\frac{1}{16}$;
Let $P = 15{,}000$ lbs.

Then from equations (2) and (3) we have

$$\text{Stress in strut} = \frac{P l_c}{4h} = \frac{15{,}000 \times 60}{4 \times 10} = 22{,}500 \text{ lbs.}$$

$$\text{Stress in tie} = \frac{P l_t}{4h} = \frac{15{,}000 \times 63\frac{1}{4}}{4 \times 10} = 37{,}720 \text{ lbs.}$$

By dividing these total stresses by the corresponding cross-sections, $a_c$ and $a_t$, or by using equations (4) and (5) in the first place, we find the stresses to be 11,250 and 15,810 lbs. per sq. in., respectively.

The deflection is, from (6),

$$\frac{15{,}000}{448{,}000{,}000 \times 100}\left(\frac{60^3}{2} + \frac{(63\frac{1}{4})^3}{1\frac{1}{8}}\right) = \frac{15 \times 276{,}700}{44{,}800{,}000} = 0.09 \text{ in.}$$

If the depth of truss had been 12 in., instead of 10 in., then the deflection would have been but 0.063 in.

These formulæ apply to all forms of simple trussed beams, composed wholly of iron or steel, whatever the form of the cross-section of the members, whether solid or hollow. A steel beam is stronger than an iron one, but it is no stiffer when the sections or weights are the same. The weakest part of an iron trussed beam is usually the back strut. The beam generally fails by this member buckling up under its compressive load. A solid section of greatest compressive strength per unit area should be square or round, but a hollow cylinder will give for this member the greatest possible strength for a given weight of metal.

*Relative merits of iron and steel.*—Since the modulus of elasticity is practically the same for iron and steel the stiffness will be the same for iron and steel beams *when the same sizes are used.* But if the steel sections are smaller, so as to make beams of the same ultimate strength, then the steel beams will deflect about one-fourth more than the iron beams. There is little or no evidence that steel beams are inferior to iron ones on account of their supposed tendency to crystallize.

The steel beams are superior to iron beams when the same sections are used, because of their greater strength and also because of their greater resilence.

*Resilience.*—The elastic resilience of the beam is the product of one-half the load by the deflection. This is the exact measure of the energy of the shock absorbed, or of the work done on the beam in deflecting it. In other words, it is the measure of the spring of the beam. It is very desirable to have the beam absorb as high a shock as possible without taking a permanent set. To do this it must be very strong, or carry a great load at its elastic limit. Since this shock also often comes from the weight of the beam itself, the strength must be great as compared to the weight; that is, we want a material with a high elastic limit, and this material so disposed as to be as light as possible for a given elastic strength. These conditions are fulfilled by using steel and by making the compression member a hollow cylinder, or some other form having great strength as a column, for a given weight.

*The Effect of Depth of Beam.*—From equations (6) and (7) it may be seen that the stiffness varies almost directly as the square of the depth. That is, a depth of 12 in. has nearly 50 per cent. more stiffness than a depth of 10 in., and a depth of 14 in. would have only about one-half the deflection given by a depth of 10 in, the same sizes of strut and tie being used in both cases. For stiffness, therefore, it is very important to make the depth as great as possible. The strength increases directly with the first power of the depth, as shown in equations (2) to (5). Or, in other

words, for a given strength the sections taken for strut and tie members would diminish directly as the depth increases. That is, a 12-in. depth would require sections 20 per cent. lighter than a 10-in. depth for the same strength. For the same deflection a 12-in. depth might have its sections of strut and tie members 40 per cent. lighter than a 10-in. depth.

The equations for deflection apply only on the supposition that the end joint is such as to admit of no bending. Thus, if the strut and tie members be joined inside of the shoe, as in the Westinghouse pattern, for high loads, there will be some bending of the extension part which carries the shoe, and this bending will therefore increase the deflection somewhat over that given by the equations. If, however, the tie rod passes through the brake shoe connection and joins to the strut by a nut at the extremity of the latter, then the load on the shoe comes directly upon the intersection of these members, or directly at the joint, and hence there would be no bending action at all, the stresses being all direct tension and compression in all the parts.

No deflection has been computed as due to the centre strut member, as the stress in this, due to the load being applied directly to it, does not in any appreciable degree add to the deflection of the truss or to the give of the brake rod under its load.

Trussed wooden beams cannot have their deflections computed with as much accuracy as iron ones because of the swelling and shrinkage of the timber, the wear of the wood under the washers, and the increasing permanent set which the stick takes under frequent repetitions of the load.

The above formulae have been tested by experiments on iron brake beams of various patterns and shown to apply with great exactness.

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Since the above article was put in type we have received from the National Hollow Brake Beam Co. copies of letters written to them by Prof. Johnson, with a table based on the Altoona tests of last year. The results of those tests were published in the *Railroad Gazette*, June 28, 1889, with the report of the M. C. B. Committee on Standard Brake Gear. Extracts from Prof. Johnson's letters follow:

"There are three important qualities required in a good brake beam: They are strength, stiffness and elastic resilience, or springiness, or that quality by which they may be able to resist shocks or blows, or sudden jars. This latter quality of resilience is apt to be opposed to that of stiffness, but it is very desirable to have both qualities represented in the same beam to a high degree. I find this to be true in your beams. In fact, they excel all others tested in all three requirements.

"I have tabulated the results of my analysis on the accomparying sheet. Since the beams were of varying weight, the results could only be compared by dividing all the results by their corresponding weights and so obtaining the results *per pound of metal in the beam*. This is a fair basis of comparison, since all these results vary directly with the weight. To be sure, when reduced to a weight of metal of one pound, the results do not represent any physical fact as shown in the test, for we could not have a beam weighing one pound, but they are the true expressions of the *relative strength, stiffness and resilience of* the beams. Thus if a beam weighing 100 pounds has an ultimate strength of 53,400 lbs., we may say its strength is 534 lbs. *for every pound of iron in it;* and if another beam weighing 80 lbs. has a strength of 37,300 lbs., we may say its strength is 466 lbs. for every pound of iron in it. We thus obtain figures which are directly comparable, and in no other way can these results be directly compared.

"To obtain an accurate basis for comparing the stiffness of the beams tested, I have computed the load required to deflect each beam 0.01 in. per lb. of weight of beam. That is, find the load required to deflect the real beam 0.01 in., and divide this by the weight of the beam, the same as was done for strength.

"The elastic resilience of the beam is the measure of the shock or blow it can absorb without being permanently distorted. It is found in inch-pounds per pound of weight of beam by taking those tests which just come up to the elastic limit, multiplying one-half the load at this point by the deflection, and dividing this by the weight of the beam. It may not be clear how this is a true measure of the elastic resilience or "shock power" of the beam to still remain uninjured, but all scientific experts would understand it. It is, in fact, the measure of the work, or energy spent in the beam, per pound of metal in it, to deflect it up to its elastic limit. Although this property may seem somewhat abstruse in this form, still it is exceedingly important to all forms of mechanism about freight or passenger cars where such shocks or blows are very common.

"The stiffness is necessary to prevent the necessity of an excessive movement of the air piston, or main brake rod, but it should be attained without any sacrifice in resilience. As may be seen by the appended tabulation, the National beam does combine both of these qualities in an eminent and superior degree.

"Thus the National beam is 15 per cent. stronger, 21 per cent. stiffer and 30 per cent. more resilient than the Pennsylvania Railroad beam per pound of metal: 19 per cent. stronger, 7 per cent. stiffer and 37 per cent. more resilient than the Westinghouse beam per pound of metal, and 28 per cent. stronger, 116 per cent. stiffer and 56 per cent. more resilient than the Central beam per pound of metal. The above percentages are taken directly from the average results in the accompanying table.

COMPARISON OF BRAKE-BEAM TESTS MADE BY THE M. C. B. COMMITTEE
*For Strength, Stiffness and Elastic Resilience, per pound of Metal in Beam.*

| Name of Beam. | | Weight. | Load of 15,000 lbs. | | Ultimate strength. | Strength per lb. of iron. | Stiffness = load to deflect beam 0.01" per lb. of iron. | Elastic resilience in inch-pounds per lb. of iron. |
|---|---|---|---|---|---|---|---|---|
| | | | Deflection. | Set. | | | | |
| National | No. 1 | 46.5 lbs. | 0".12 | 0".00 | 25,350 | 545 | 26.8 | |
| " | " 2 | 51.1 " | .115 | .01 | 28,030 | 549 | 25 5 | |
| " | " 3 | 64.1 " | .08 | .00 | 35,500 | 555 | 29.2 | |
| " | " 4 | 100.0 " | .055 | .00 | 53,400 | 534 | 27.3 | 30.0 |
| " | " 5 | 99.5 " | .06 | .00 | 47,5.0 | 480 | 25.2 | |
| | | | | | Mean = | 533 | 26 8 | |
| P. R. R. (Westinghouse type) | " 1 | 80.0 " | .09 | .01 | 37,300 | 466 | 20 8 | |
| " " | " 2 | 72.5 " | .105 | .01 | 34,000 | 469 | 19.6 | |
| " " | " 3 | 69.5 " | .105 | .005 | 30,000 | 432 | 20.4 | |
| " " | " 4 | 68.0 " | .09 | .00 | 36,200 | 532 | 24.4 | 21.1 |
| " " | " 5 | 61.0 " | .09 | .01 | 27,500 | 417 | 25.2 | |
| | | | | | Mean = | 463 | 22.1 | |
| P., C. & St. L. " | " 1 | 64. " | .11 | .00 | 27,000 | 422 | 21.3 | |
| Westinghouse | " 1 | 76. " | .105 | .015 | 32,000 | 421 | 18.7 | |
| " | " 2 | 88. " | .06 | .00 | 34,000 | 386 | 28.2 | |
| " | " 3 | 78. " | .09 | .00 | 38,860 | 498 | 21.3 | 18.9 |
| " | " 4 | 79.5 " | .06 | .00 | 38,700 | 490 | 31.5 | |
| | | | | | Mean = | 449 | 25 | |
| Central | " 1 | 60. " | .155 | .025 | 31,500 | 456 | 14.0 | |
| " | " 2 | 79. " | .17 | .01 | 23,000 | 291 | 11.2 | |
| " | " 3 | 72. " | .155 | .025 | 30,570 | 425 | 13.4 | |
| " | " 4 | 88. " | .14 | .02 | 36,000 | 409 | 12.2 | 13.3 |
| " | " 5 | 87. " | .155 | .045 | 42,950 | 494 | 11.1 | |
| | | | | | Mean = | 415 | 12.4 | |

"The P. C. & St. L. beam did not have any elastic limit determined, but the National beam was 26 per cent. stronger and 26 per cent. stiffer per pound of metal than the one specimen of this form which was tested.

"I attribute the increased values found for the National beam to the observance of true scientific principles in its construction, especially in the character of the end joint and in the use of a hollow compression member. I do not see how it is possible to get better results out of a given weight of metal.

"In reply to your favor, inquiring as to the way in which resilient action of brake beams affects their life and utility, I would say:

"1. Some resilience or spring in the beam is necessary to protect it from harm when sudden shocks or blows come upon it. It must have strength to withstand the dead pull of the brake rods. But strength alone will not resist shock; we must combine strength with deflection, or distortion under load, to get resilience, or resistance to shocks. In order that the beam may remain uninjured also, this distortion or deflection must be within its elastic limit. That is to say, it must not take a permanent set. It is well known that wood will take a permanent set under a very small load if it is long continued, or if frequently imposed. Although such a beam has great resilient action under a single or under a few shocks, this resilience is not elastic resilience; that is, it is not within the elastic limits of the material. It is only the *elastic resilience*, therefore, which is valuable in a brake beam.

"2. It may be shown that a trussed beam gives not only a greater strength, but also a greater stiffness and a greater elastic resilence than any other form of solid beam or plate girder. This is but a matter of mathematical analysis, provided all are of the same material and of the same weight.

"3. Of different kinds of trussed beams, all of the same span and depth of truss or length of middle strut piece, that form will have the greatest strength and elastic resilience, for a given weight, which allows of the highest stress in the parts before taking a permanent set. In any properly proportioned beam of this character the back strut will give way first by buckling up under a compressive stress, and thus take a permanent set and require a readjustment of the brake rods.

"It is an experimental fact, also sustained by theory, that a hollow cylindrical form gives greater strength in compression than any other, and allows of a higher stress before coming to its elastic limit. This explains why the hollow compression member of the National beam gives both a higher strength and also a higher elastic resilience than the solid forms.

"That this conclusion is borne out by the experiment is abundantly shown by the Altoona tests, where the elastic resilience of the National beam, in inch-pounds per pound of metal in the beam, is 30; while that of the P. R. R. beam was but 21; for the Westinghouse, 19; for the Central, 13, and for the Marden but 7.5. This measure of resilience is found by multiplying the load at the elastic limit by one-half the deflection at that point, and dividing by the weight of the beam."

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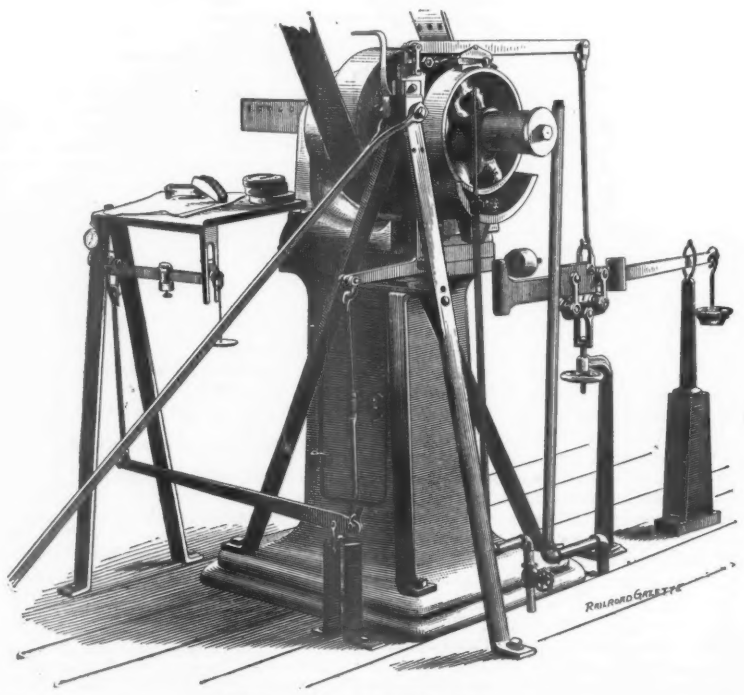
### Tests of Brake Shoe Metals.

Our readers will remember that at one of its preliminary meetings the M. C. B. Committee on Metal for Brake Shoes appointed three sub-committees to assist in collecting information by shop tests. This was designed to facilitate the road tests and to determine, if possible, what apparatus would be necessary to get at satisfactory results. Only one of these sub-committees has reported thus far. This is the committee appointed to work at Aurora, and in what follows is given its preliminary report. The committee consists of Mr. F. W. Sargent, Engineer of Tests of the Chicago, Burlington & Quincy; Mr. W. D. Sargent, of the Congdon Brake Shoe Co.; and Mr. D. L. Barnes, of the *Rail-*




BRAKE SHOE TESTING MACHINE.

USED IN THE SHOP TESTS OF THE MASTER CAR BUILDERS' SUB-COMMITTEE.

*road Gazette.* The apparatus used, after considerable preliminary work to determine what was most suitable, is shown herewith, together with some of the results obtained on the machine.

The illustration shows the machine complete, ready for a test. The main body of the machine is that of a Thurston oil tester, from which the journal sleeve and pendulum attachments have been removed, and a wheel on which the shoes are tested keyed on to the shaft. The shoe rests on the wheel directly above the centre of the shaft.

The load is brought on the shoe by means of the lever shown. A few turns of the hand wheel draw the lever down and bring up the scale beam which has been set to give the required weight on the shoe, due allowance having been made for weight of parts. The load lever is so connected by means of the link at the fulcrum that the shoe and lever are free to move with the wheel, so far as

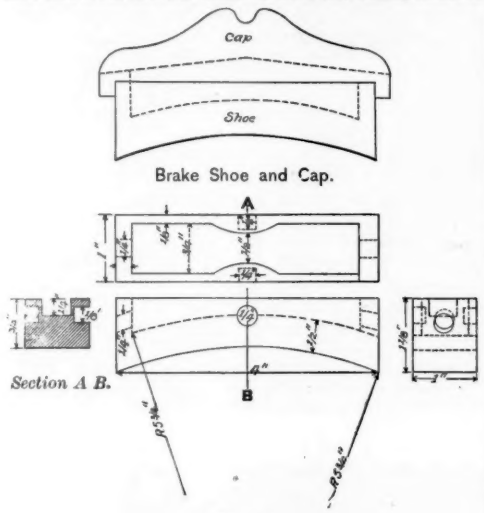



Fig. 4.
Experimental Brake Shoe, Shop Test.

the loading arrangement is concerned. This tendency to move forward is weighed by an independent arrangement, and the force necessary to hold the shoe in its proper place is weighed by the second scale beam, termed the "friction scale." This is connected to the shoe by means of levers shown, the link at the end of the bell crank lever coupling into a yoke which is fastened to the shoe at its middle on each side. This connection is such that the shoe is free to adapt itself to the wheel, so that the pull is always direct. The speed of the wheel is obtained by reading the revolution counter and timing with a stop watch. These are shown at the rear of the machine.

In making a test, the machine is started light, and the hand wheel is turned until the scale beam rises. The observer then seats himself opposite the friction scale beam, and by moving the sliding weight keeps the scale beam balanced, recording at one minute intervals the weight, and at two minute intervals the speed, for a period of ten minutes. Thus, in each test there are ten observations of the friction, each of which is an average, and five observations as to speed. The shoe is accurately weighed before and after the test, to show the wear. Observations to date have indicated no appreciable wear in the chilled iron wheel. No tests have yet been made on steel tires. The construction of the test shoe is such that water can be run through it to carry off some of the heat, the cap making a water-tight joint with the top of the shoe.

Ten-minute runs without cooling have proved most satisfactory, the excessive wear of some of the shoes rendering a longer run impracticable.

The heat generated is great, so that it is impracticable to measure it accurately. All shoes get more or less red hot on the edges, and as no marked change in friction has been observed which would indicate a change in holding power due to temperature rising, the question of temperature has not been considered. The form used in recording the tests follows:

BRAKE SHOE TESTS.

No..... Date.....
Kind of shoe..... Weight of shoe before.....
after.....
Loss.....
Made by.....
Kind of wheel..... Tem. of water before.....
after.....
Load on shoe..... Heat of shoe.....
.....

| Time. | Friction scale. | | Speed. | | Remarks |
|---|---|---|---|---|---|
| | Reading. | Actual. | R. P. 2 M. | M. P. H. | |
| | | | | | |

Considerable variation in the wear and holding power of shoes has been noticed in the different shoes tested, the results of different tests of the same shoe often

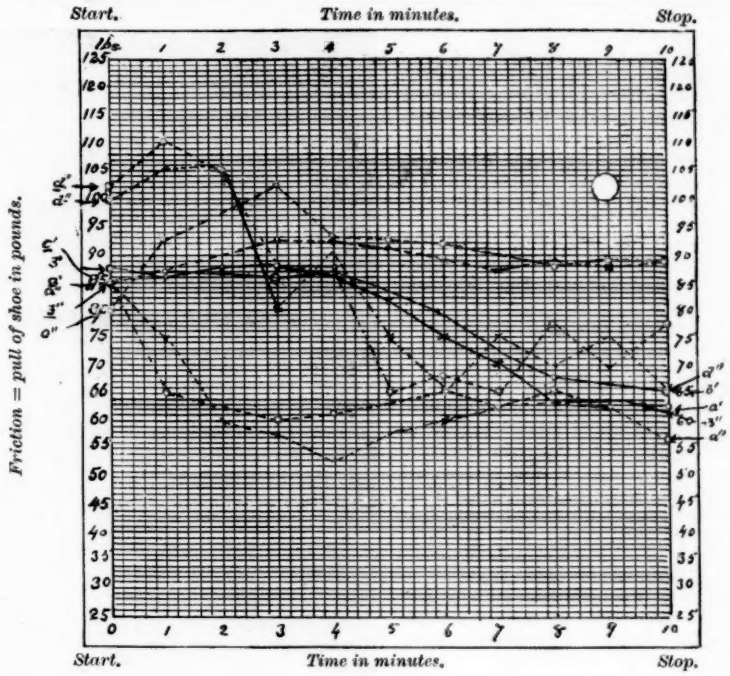



Fig. 1.

*Load, 400 lbs.; wheel, chilled cast iron, 11 7/16 in. diam.; shoe, 4 in. × 1 in. face.*
*Speed, 600 revs. per minute = 20 miles per hour.*
*Curves: b = No. 7; c = No. 2; a = No. 9; d = No. 5.*

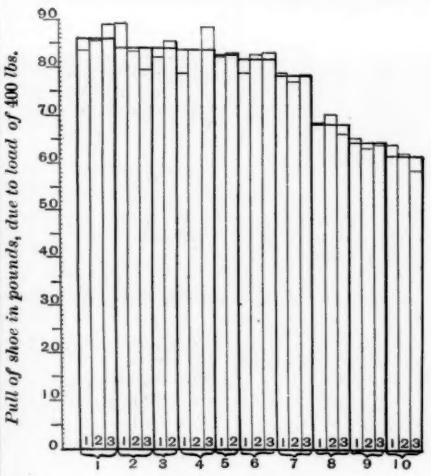



Fig. 2.
Comparative Friction of 10 Different Brake Shoes.

*Light lines show individual tests.*
*Dark lines show averages.*
*Face of shoe, 4 in. × 1 in. Load, 400 lbs.*

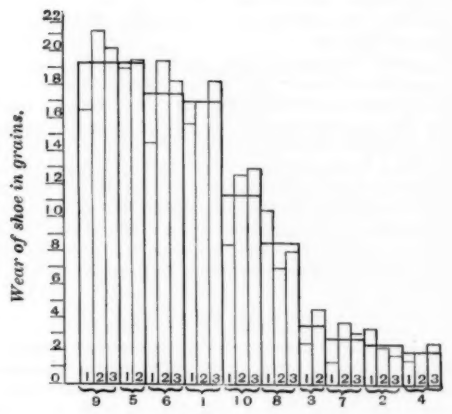



Fig. 3.
Comparative Wear of 10 Different Brake Shoes.

*Wheel, cast iron chilled, 11 7/16 in. diam.*
*Speed, 600 revolutions per minute = 20 miles per hour.*

## SHOP TESTS OF BRAKE SHOES.—M. C. B. COMMITTEE.

varying considerably, but the general averages as shown below are sufficient to give a distinctive place in the scale for each composition, or shoe metal. As a general thing the results are practically duplicated.

As an illustration, duplicate tests on four shoes are shown in fig. 1, plotted in the form of curves, showing the change of pull, or friction at each minute observation. Here the horizontal lines denote the pounds shown on the friction scale and the vertical lines the times of observation.

The comparative friction or holding power of the various shoes is graphically shown in fig. 2, which represents successive runs of each shoe, and the general average of each set of runs. The runs noted are not made all at the same period for each shoe—that is, shoe marked 1 has been tested three times—but these tests may be made at intervals of several days, other tests having been made on the same wheel in the meantime. They represent, however, the 1st, 2d, and 3d run of that shoe, and in the case of No. 1 show both in wear (fig. 3) and friction (fig. 2) that the metal is softer towards the centre of the shoe, or as the shoe wears down, No. 1 in this case being a soft cast iron shoe. Other shoes act exactly opposite, as shown by No. 2, which shows diminished friction and wear as the tests are repeated. No. 4 represents a plain wrought iron shoe.

The results here indicated represent but a small portion of the records obtained to date, and are all confined to the cast-iron wheel with chilled face. The indications point to practically no wear of the wheel or injury to the wheel by the brake-shoe, but they clearly show the superiority of some shoes over others.

This information is published for the purpose of indicating what the committee is doing in the way of testing brake-shoe material and the nature, comparatively, of the results obtained. Similar tests are now being made against a steel-tired surface.

### The Brooks Locomotive Works.

[The following notes should have appeared in our account of these works published May 16:]

The Dunkirk Engineering Works, which are building hydraulic machinery under the Naylor-Armstrong design, are fitting these works with a complete hydraulic plant for all work to which such power is adapted. Among these machines are hydraulic flangers, cranes, riveters, and lifting jacks. The lifting machines, which were formerly driven by steam, have been fitted with hydraulic cylinders and are now doing better work with less trouble and apparatus. The accumulators and hydraulic pumps are located in a separate building erected for the purpose. The power for these works is obtained from a series of boilers, arranged side by side, which are fed with a Murphy automatic stoker, and a new boiler and another stoker of the same make will soon be put in. Throughout the works a narrow-gauge track system is arranged to carry material from one shop to another.

The foundry is overcrowded and a new one is being built; the foundations are already in. It will be equipped with the latest molding machinery and all facilities for doing work well and quickly. The pattern shed, which is a fireproof structure well arranged, is too small, and a larger one is to be built. The arrangement and classification of the patterns is such that every night when the books are posted any individual pattern can be readily found, the name of the man using it being entered in a book opposite the number of the pattern.

The boiler shop is sufficiently large for all present demands and is admirably lighted and well arranged. It

has two power riveters, with hydraulic lifts, arranged in a compartment at the end of the main building. Over the main floor travels a large crane of 30-ton capacity. Among the specialties in boiler work here are two rows of rivets in the mud ring of all the boilers and three, four or more rows of rivets in a plain lap seam for the boilers of large diameter and high pressure. Welt strips and butt joints are not in favor.

The blacksmith shop is full of tools of modern make. Oil fuel is used to a large extent for heating. Many details for locomotives are made by the drop process, and a bulldozer working in connection with a large iron furnace takes the place of several good blacksmiths and laborers and performs the work with greater accuracy. The smoke is taken away by exhaust fans.

Good case hardening is one of the most difficult operations which a locomotive builder has to perform. On a Western road recently an investigation showed that there were several methods of case hardening in vogue in different shops, hardly one of which was entirely satisfactory. At these works the matter has received special attention, and the development of the process has reached a point where they can with absolute certainty case harden to reasonable depth any size of iron. It is possible by the process used to case harden a large crank-pin to the depth of ⅛ in., and the smaller details like links, etc., can be hardened to a depth of ¼ in. if thought desirable. The materials used for case hardening are simple commercial compounds easily obtained and requiring no special knowledge to manipulate. These works are lighted by electricity, both incandes-cent and arc lights being used. The lighting plant is located in the rooms formerly occupied as office of the works.

There has been for some years here a small testing department, in which is some good machinery, but a larger room has been arranged into which will be moved the testing machines and where will be established a chemical laboratory for testing all materials used in the works. Among the novelties in the test department is an impact tester for cast-iron which measures the strength of iron under shocks.

Recently the management of the shops has been reorganized as follows: Mr. David Russell has been appointed Superintendent. He has been with the works since the organization, and up to the present time has been Assistant Superintendent. Mr. H. Tandy has been appointed Assistant Superintendent. He was recently Superintendent of Motive Power of the New York, Ontario & Western but has been locomotive designer for the Brooks Co. in previous years. Mr. John Player, recently made Mechanical Engineer, has had a large experience both in this country and in Europe.

## The Hicks Stock Car.

An important improvement in stock cars is shown by the accompanying illustrations of the interior of a stock car having adjustable parts to suit various kinds of freight other than live stock. This car has just been completed; it is the first one built and is now on exhibition in Chicago.

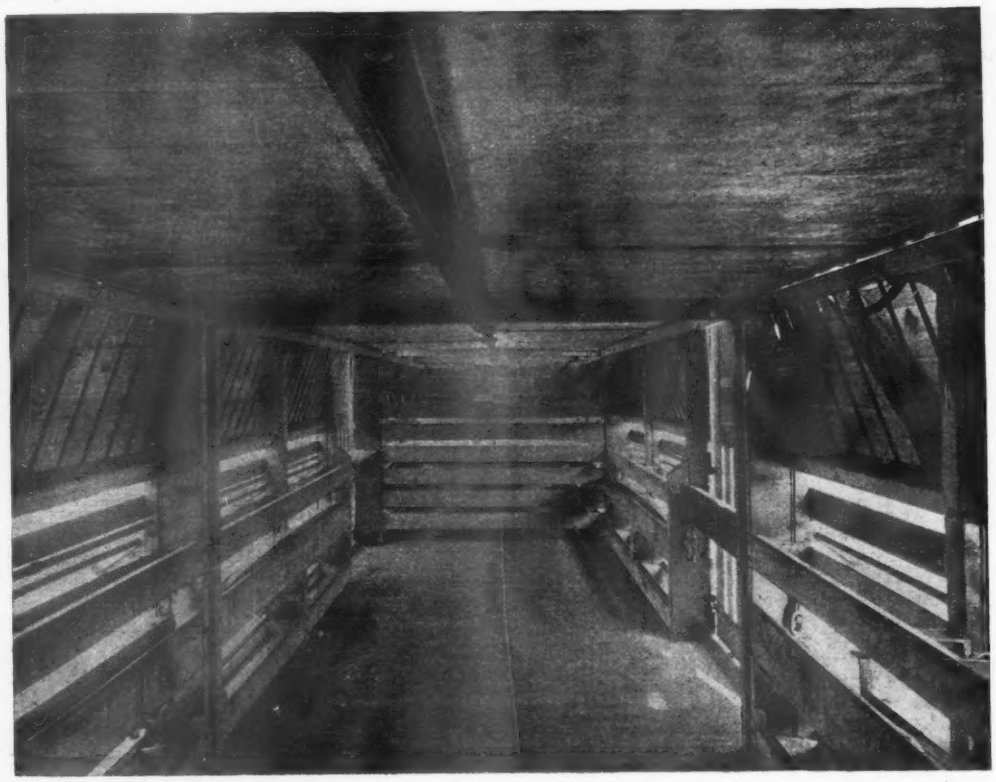
The novelty of this car is a folding upper deck of ingenious design, which can be raised into the roof in sections entirely out of the way when not in use. It can be raised or lowered by one man, and its construction makes it as substantial for the purposes used as any permanent upper deck would be.

Gates or partitions divide the car into three 12-ft. compartments, the gates being arranged so that they can be easily raised to the roof or lowered, even when the car is loaded with stock. The body is designed to carry a load of 50,000 lbs., and an arrangement of the upper deck by which it can be dropped to the side of the car renders it possible to carry a load of coal 4 ft. high from the floor.

Particular attention has been devoted to the riding of the car, and to that end it is mounted upon swing-motion trucks having elliptic springs and each truck has a wheel base of 5 ft. 6 in.

Among the other interesting features noticeable from examination is a perfectly smooth interior. To obtain this round-headed bolts are used instead of nails and all projections have been avoided. In the illustrations can be seen the watering facilities for all kinds of stock, whether small or large. Also additional hay storage room above the ricks sufficient for a five days' journey.

The operation of the gates from the outside of the car is a decided advantage, particularly when the cars are filled with live stock. The car is constructed of oak, and, being equipped with the automatic air brake and vertical plane couplers, it is expected that it will be eminently satisfactory for general freight service and obviate the necessity for a movement empty in one direction over a road as is often the case with the ordinary car. The proprietor of these devices is the Hicks Stock Car Company at Chicago, with offices in the Rookery Building. A considerable number of cars are now under construction for various railroad companies in the west.



THE HICKS STOCK CAR.

## "Triplex" Spur-Gear Block.

The general construction of this block will be understood by reference to the accompanying illustrations, in which fig. 1 is an external view of the front of the block, as arranged for use.

All of the mechanism is symmetrically grouped upon a single horizontal axis, and is so arranged as to occupy as little vertical space as possible, thus obtaining the maximum height of hoist. Power is applied to an endless hand chain passing over the pocketed chain-wheel on one end of the central shaft, and is transmitted thereby to the train of spur-gearing contained in the housing on the other side of the block. The main or load-chain passes over a pocketed chain-sheave in the centre of the block, one of its ends being provided with a suitable hook for receiving the load, and the other being looped up and permanently secured to the frame of the block. The latter arrangement diminishes the length of the slack chain, prevents it from fouling and adds much to the convenience of the block.

Fig. 2 is a transverse view of the block, the lower half being shown in section. The hand wheel at the left transmits power through the central shaft to the steel pinion on its opposite end (seen best in fig. 3), which in turn engages with the three planet wheels surrounding it. These latter are of hard bronze and have cast with them a smaller series of pinions, shown in fig. 2, which latter engage with the annular gear cast in the stationary frame of the block, as shown, fig. 3. The three double planet wheels are carried in a frame or cage which supports both ends of each of the pins forming the axles of the wheels. As the central shaft is turned, the whole cage and its three pinions thus rotate slowly within the housing of the block.

Referring to Fig. 2, it will be seen that the inner side of the pinion cage consists of a disc keyed to one end of the steel sleeve forming part of and carrying the hoisting chain sheave, so that the rotary motion of the pinion cage is thus transmitted to the chain sheave. The two hubs of the latter are prolonged to form bearings on each side in the frame of the block, and are bored through the center to permit the shaft of the hand chain wheel to pass through the sleeve thus formed. The mechanism thus described constitutes the entire gearing by which the load is hoisted, and is obviously not self-sustaining.

The device by which the load is automatically sustained under all conditions, and whereby lowering is accomplished when desired, will now be described.

By referring to fig. 2 it will be seen that the hand-chain wheel is screwed on to a sleeve keyed to the central shaft. When power is first applied to hoist, the effect is to screw the hand-wheel against the series of friction plates shown in fig. 2, which in turn bear against the discs rotatating with the central shaft and carrying with it a roller-check mechanism fitting into a recess formed in the left-hand frame of the block. The construction is such that so long as hoisting continues, the small steel rollers of the checking mechanism offer no resistance; as soon, however, as hoisting ceases, and the load causes reversion of movement, these rollers mount on their inclined paths and frictionally check the frame which carries them, preventing its further rotation.

This frame in turn locks one set of the friction discs and prevents them from turning; the other set of discs, being frictionally engaged with the first, also remain stationary, and by their friction, prevent the hand-wheel from turning backward. The load thus remains auto-

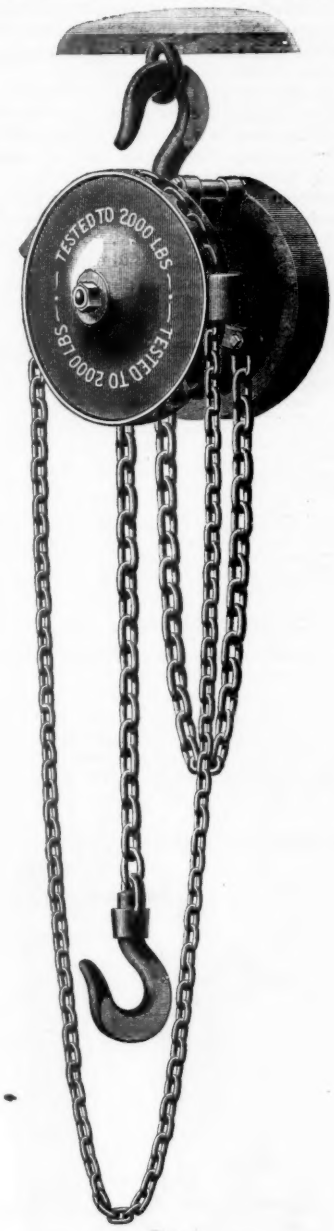



Fig. 1.

matically sustained, and cannot possibly run down unless power be applied to the hand-chain.

Lowering is accomplished by lightly pulling on the hand-chain. The effect of this is to unscrew the hand-wheel on its sleeve, the latter remaining stationary for a moment under the influence of friction and inertia. As soon as this is unscrewed enough to release the two sets of discs from frictional engagement, the set which is carried by the sleeve of the main chain wheel begins to rotate backward under the impulse of the load. This motion, overtaking that of the other set of discs carried by the hand wheel, again forces the two sets into frictional engagement and tends to check the descent of the load. The continued rotation of the hand wheel, however, will again release the friction on the discs and again permit a further lowering. In point of fact these successive releasings and engagements occur at such short intervals as to constitute a practically continuous movement whereby the load descends smoothly and quietly as long as the hand chain is kept in motion. So long as the backward motion of the hand-chain continues, the device just described operates smoothly and noiselessly, permitting the load to run down at rapid speed, *but without acceleration*, and with a pull on the hand chain which does not exceed eight to ten pounds when lowering the maximum load. If the pull on the hand-chain be discontinued, the lowering action will cease. The pull required to lower is so light as to easily permit of "spinning" the hand-chain, thus obtaining a fly wheel effect, and enabling lowering to be accomplished at high speed. This motion, however, can be controlled or instantly

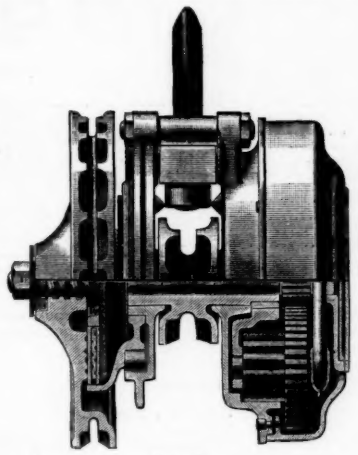


Fig. 2.

checked by the application of a slight resistance from the hand.

Below are some extracts from a report made by Prof. Thurston on eight different blocks. All were tested as furnished by the dealers ready for use, and were in no way specially prepared for testing:

It was observed that all, except the Weston "triplex" block, employed some form of gearing or purchase having a very low mechanical efficiency, and that in most cases the quality of being self-sustaining, which is characteristic of this class of blocks, was due to the low efficiency; or, in other words, to the excessive friction of the mechanism. This is true of the original Weston differential block, as well as of those of later variety, which have been introduced to compete with it. As a rule these blocks have a high velocity ratio, and are compact, useful, very handy and light, but are exceedingly wasteful of power, most of them utilizing only from 20 to 30 per cent. of the applied power.

The new Weston "Triplex" block, on the contrary, has a very simple and compact triple train of spur-gearing, and thus develops a remarkably high efficiency as compared with any of the older types of chain blocks. Its efficiency is so high, indeed, that it becomes impossible to rely upon the friction of the apparatus to sustain the load. For the latter function a separate and simple

Fig. 3.

friction device is introduced. This independent sustaining mechanism automatically holds the load suspended, and yet enables it to be lowered at pleasure with the exertion of a very slight effort, and at high velocity, but without acceleration or danger. In all of the older blocks I found that a considerable effort was required to *pull a load down*, as well as to raise it, the amount of this pull, in the case of a load of 2,000 lbs., ranging from 92 lbs. down to 41 lbs., except in one case where it was only 14 lbs., but where the velocity ratio of the block was relatively high. In the case of the "Triplex" block, with a low velocity ratio, this pull was *only 8 lbs.*

It is to be noted that ease of working is not in itself necessarily a measure of the efficiency of a block. Other things being equal, that block which has the highest ratio of velocity of hand chain to speed of hook and load will run the easiest, but it will also work the most slowly, the ease of action being purchased at the sacrifice of speed in the motion of the load. The efficiency may thus be very low, and yet the block may work very easily.

I have deemed it best in the table of lowering efficiencies to show both the work performed in foot-pounds, and also the relative efficiency of the several blocks, including the element of time, the latter being, in my opinion, the only complete basis of comparison. An examination of the two tables showing hoisting and lowering efficiencies will indicate the relative values of the several blocks as determined by the tests. The two Weston blocks are indicated by name, and the others, for obvious reasons, by designating numbers only.

The foregoing figures indicate fairly the relative efficiencies of the several blocks, and show that the new Weston "Triplex" spur-gear block excels all its predecessors to a remarkable extent. The secret of its excellence lies in the fact that while in other types of blocks a wasteful friction is chiefly relied upon to prevent the load once raised from running down, the "Triplex" block is designed with a view to reducing the lost work of friction, both in hoisting and lowering, to a minimum, and to obtaining the highest mechanical efficiency.

The beautiful design and excellent construction of the "Triplex" block justify far more consideration and commendation than the consulting engineer is often able, or willing, to give to such matters. I cannot speak too highly of it, and I predict for it a general acceptance wherever economy of time, effort or repairs is a consideration in the use of chain blocks.

The hoisting efficiency of the "Triplex" block being from 2½ to 4 times greater than that of others, the wear resulting in its hoisting should be only ⅝ to ¼ as much. A still greater difference exists, however, in the wear due to friction in lowering. The reduction in amount of wear from friction in the "Triplex" block, relatively to others, is even greater in lowering than in hoisting. It is reasonable to infer, therefore, that the "Triplex" block will outwear any of its competitors, and that experience will show it to possess an endurance at least 5 to 10 times greater than some of them.

COMPARATIVE EFFICIENCY OF BLOCKS, BOTH IN HOISTING AND LOWERING.

| Work of Hoisting. [Load of 2,000 pounds.] | | | | Number of block. All blocks of one ton capacity. | Work of lowering. [Load of 2,000 pounds lowered 7 feet in each case.] | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Exclusive of factor of time. | | | | Inclusive of time. | |
| Waste by friction. Per cent. | Actual efficiency. Per cent. | Relative efficiency. | Velocity ratio. | | Pull on hand chain. Lbs. | Length of hand chain. Feet. | Work performed. Ft. lbs. | Relative force expended by operator. | Time in minutes. | Relative efficiency. |
| 20.50 | 79.50 | 1.00 | 32.50 | 1 (Weston's Triplex.) | 8.00 | 227 | 1,816 | 1.00 | 0.75 | 1.000 |
| 68.00 | 32.00 | .40 | 62.44 | 2 | 14.00 | 436 | 6,104 | 3.33 | 1.20 | .186 |
| 69.00 | 31.00 | .39 | 30.00 | 3 (Weston's Differential.) | 92.30 | 196 | 18,090 | 10.00 | 1.50 | .050 |
| 71.20 | 28.80 | .36 | 28.00 | 4 (Weston's Imported.) | 92.60 | 158 | 15,556 | 8.60 | 2.50 | .035 |
| 73.96 | 26.04 | .33 | 48.00 | 5 | 72.30 | 17.5 | 1,282 | .71 | 2.80 | .380 |
| 75.96 | 24.34 | .31 | 53.00 | 6 | 56.60 | 370 | 20,942 | 11.60 | 1.80 | .036 |
| 77.00 | 23.00 | .29 | 44.30 | 7 | 55.00 | 310 | 17,050 | 9.40 | 2 75 | .029 |
| 81.03 | 18.97 | .24 | 61.00 | 8 | 48.50 | 426 | 20,000 | 11.60 | 3.75 | .018 |

## National Convention of Railroad Commissioners.

Pursuant to the call of the committee, this convention met at the office of the Interstate Commerce Commission, Wednesday, May 28, at 11 a. m. The following persons were present:

*Connecticut.*—George M. Woodruff, William O. Seymour.

*Florida.*—E. J. Vann.

*Illinois.*—J. R. Wheeler, Isaac N. Phillips, J. H. Paddock, Secretary; Charles Hansel, Consulting Engineer.

*Iowa.*—Spencer Smith.

*Kentucky.*—I. A. Spalding, W. B. Fleming.

*Maine.*—D. N. Mortland, A. W. Wildes, Roscoe L. Bowers.

*Massachusetts.*—George G. Crocker, Edward W. Kinsley, Everett A. Stevens.

*Michigan.*—John T. Rich.

*Minnesota.*—John P. Williams, A. K. Teisberg, Secy.

*Missouri.*—J. B. Breathitt.

*Nebraska.*—L. W. Gilchrist, W. S. Garber.

*New Hampshire.*—John M. Mitchell.

*New York.*—Isaac V. Baker, Jr.

*North Dakota.*—David Bartlett.

*Ohio.*—James A. Norton.

*Pennsylvania.*—Isaac B. Brown.

*Rhode Island.*—B. L. Freeman.

*South Carolina.*—Milledge L. Bonham, Eugene P. Jervey.

*South Dakota.*—John King.

*Vermont.*—E. J. Ormsbee; Alfred E. Watson, Clerk.

*Wyoming.*—J. W. Hammond, Ac. Rep.

*Railroad Accounting Officers.*—J. P. Whitehead, Comptroller, Atchison, Topeka & Santa Fe R. R. Co.; A. Douglass, Auditor, St. Louis & San Francisco Ry. Co.; J. C. Courtney, Auditor, Western & Atlantic R. R. Co.; Oliver W. Mink, Comptroller, Union Pacific Ry. Co., representing Executive Committee of Association of American Railway Accounting Officers; C. G. Phillips, Secretary; Association of American Railway Accounting Officers, C. I. Sturgis, Assistant General Auditor, C., B. & Q. R. R.

*Representatives of the Press.*—A. T. Hadley, *Railroad Gazette*; James Peabody, *Railway Review;* H. R. Hobart, *Railway Age.*

Hon. T. M. Cooley was appointed Chairman, E. P. Jervey, of South Carolina, Vice-Chairman, and E. A. Moseley, Secretary. In his opening address, Judge Cooley spoke of the progress which had been actually made toward uniformity in railroad legislation. Since the date of the last convention eight or nine States have made their railroad returns end on June 30, to conform to the fiscal year of the commission, and four have adopted the commission's form in detail, besides those which had done so during the year previous. Judge Cooley's health is by no means fully re-established; and it showed his great interest in the convention that he could be induced to preside at the opening session.

A committee, consisting of Messrs. Seymour, of Connecticut; Ormsbee, of Vermont; Phillips, of Illinois; Gilchrist, of Nebraska, and Rich, of Michigan, was appointed to confer with the statistician of the Interstate Commerce Commission and the representatives of the

Association of American Railway Accounting Officers, on the subject of railroad reports and statistics. The same general changes were urged as last year, only much more in detail. The work of making up the report occupied this committee the whole day.

Mr. Crocker, of Massachusetts, submitted a report from the Committee on the Means for securing Harmony in Railroad Legislation, appointed a year ago. The report says that the lack of harmony between State and Congressional Legislation on traffic matters is much of it due to slight differences in phraseology, which lead to wholly different interpretations. These could best be remedied by the adoption, on the part of the States, of the phraseology employed in sections 2, 3, 4 and 22 of the Interstate Commerce Act. The need for harmony extends far beyond the sphere of traffic regulations, or the things which Congress has already touched. The States must come to an agreement among themselves on safety appliances to avoid the dangers incident to premature Congressional action. There should be uniformity in the use of terms; in the baggage allowance; in the arrangements for live stock, and for weighing, storing and delivery of grain. Train heating and lighting have not reached the point where legislation is possible, except as regards fire test for illuminating oils to be used. There might be requirements as to the number of brakemen to a train; there should be as to train and engine brakes. Uniformity in couplers, on the lines of the M. C. B. type, should be urged. Frogs and switches should be blocked. There should be uniformity in many minor police regulations, in the liability for accident, and in methods of corporate organization. Selecting the subjects deemed most important, the committee recommended the passage of the following resolutions:

Resolved, That it is expedient that the laws of the several States should be in exact harmony with the provisions of the Interstate Commerce Act on the following topics:

The definition and prohibition of unjust discrimination.

The prohibition of undue and unreasonable preferences and advantages.

The requirement of equal facilities for the interchange of traffic.

The regulation of the relations between rates of compensation to be allowed for long and short hauls.

The regulations as to printing and posting rates, fares, and charges.

The regulations as to notice to be given of advances and reductions in rates.

The penalties for false billing, false classification, false weighing, etc.

Resolved, That the respective states shall require either directly by law or indirectly through the instrumentality of their Railroad Commissions each railroad corporation subject to their jurisdictions to place upon every freight car hereafter constructed or purchased by it, and upon every freight car owned by it, the coupler or drawbar of which is repaired by it, an automatic coupler of the Master Car Builders' type at each end of the car.

Resolved, That a uniform requirement of train brakes on freight cars and of driving-wheel brakes on locomotives is desirable.

Resolved, That Congress either directly by law or indirectly through the instrumentality of the Interstate Commerce Commission should take similar action.

George G. Crocker, Chairman.

The afternoon session was occupied with the discussion of these resolutions. The chief points in the debate were as follows:

Should the harmony of phraseology be "exact" or only "substantial?" Should the short haul clause be approved? Should the Master Car Builders' type of coupler be indorsed? Should a specific time be set for the compulsory adoption of automatic couplers and train brakes?

Amendments to do away with the word "exact" and otherwise weaken the force of the resolution as to harmony were voted down. The proposed endorsement of the short haul clause provoked active discussion. It was opposed by the delegation from Maine and by Mr. King of South Dakota; but an amendment striking it out from the resolution was defeated 18 to 10. The clauses with regard to safety appliances were modified to read as follows:

Resolved, That the respective states should require either directly by law or indirectly through the instrumentality of their Railroad Commissions each railroad corporation subject to their jurisdiction to place driving wheel brakes and apparatus for train brakes upon every locomotive, and train brakes upon every freight car hereafter constructed or purchased by it, and also upon such cars and upon every freight car owned by it, the coupler or drawbar of which is repaired by it, an automatic coupler of the Master Car Builders' type at each end of the car.

The following figures of railroad accidents for the year ending June 30, 1889, were presented by Professor H. C. Adams, Statistician to the Interstate Commerce Commission, with the classified table:

The railroads of the United States carried 472,171,343 passengers during the year covered by this statement, from which it appears that one passenger in every 1,523,133 was killed, and one passenger in every 220,024 was injured. For the year 1888, the rate of casualty in England to passengers from railroad accidents was one passenger in 6,942,336 killed, and one passenger in 527,577 injured. In judging of the above figures, it should be noted that passenger mileage for a given number of tickets sold is much greater in the United States than in England, a fact which mitigates somewhat the severity of judgment upon railroad management in the United States disclosed in the above comparison.

In order to appreciate the above exhibit of casualties to employés of railroads, it is necessary to know the number of employés liable to the various sorts of accidents recorded. The total number of railroad employés in the United States is 704,736, which for the present purpose may be divided into trainmen, switchmen, flagmen and watchmen, and other employés. The number of employés in each class, as also the casualties to each class, is given in the following statement:

CASUALTIES TO EMPLOYES, ASSIGNED TO CLASSES NAMED.

| Class of Employés. | Number. | Killed. | Injured. |
|---|---|---|---|
| Trainmen | 137,334 | 1,179 | 11,301 |
| Switchmen, Flagmen and Watchmen | 33,344 | 229 | 2,155 |
| Other employés | 517,820 | 536 | 6,360 |
| Unclassified | 16,238 | 28 | 214 |
| Total | 704,736 | 1,972 | 20,030 |

RAILROAD ACCIDENTS FOR THE YEAR ENDING JUNE 30, 1889.

| Kind of Accident. | Employés. | | Passengers. | | Other Persons. | | Total. | |
|---|---|---|---|---|---|---|---|---|
| | Killed. | Injured. | Killed. | Injured. | Killed. | Injured. | Killed. | Injured. |
| Coupling and Uncoupling Cars | 300 | 6,757 | ... | ... | ... | ... | 300 | 6,757 |
| Falling from Trains and Engines | 493 | 2,011 | ... | ... | ... | ... | 493 | 2,011 |
| Overhead Obstructions | 65 | 296 | ... | ... | ... | ... | 65 | 296 |
| Collisions | 167 | 820 | 107 | 445 | 37 | 48 | 311 | 1,313 |
| Derailments | 125 | 655 | 28 | 389 | 29 | 69 | 182 | 1,113 |
| Other Train Accidents | 189 | 1,016 | 26 | 247 | 522 | 515 | 737 | 1,778 |
| At Highway Crossings | 24 | 45 | 3 | 16 | 410 | 634 | 437 | 695 |
| At Stations | 70 | 699 | 26 | 295 | 328 | 472 | 424 | 1,466 |
| Other causes | 539 | 7,729 | 120 | 754 | 2,215 | 2,397 | 2,874 | 10,880 |
| Total | 1,972 | 20,028 | 310 | 2,146 | 3,541 | 4,135 | 5,823 | 26,309 |

The above facts were presented without comment respecting their significance or bearing upon the general question of legislation.

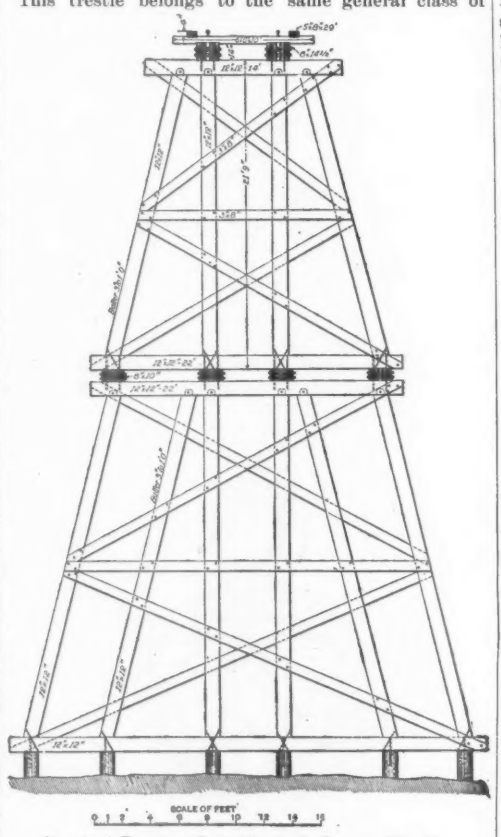
## Wooden Trestle Bridges.*

BY WOLCOTT C. FOSTER.

### Standard Trestle Plans Fort Worth & Denver City Railway.

The cut shows the framing of the standard two-story trestle bent of the Fort Worth & Denver City Railway, of which road Mr. F. E. Bissell is Chief Engineer.

This trestle belongs to the same general class of




Standard Trestle—Fort Worth & Denver City Ry.

structure as that illustrated in the *Railroad Gazette* of April 25, 1890; that is, those in which the decks are separated by purlins. It, however, differs from the one referred to in nearly all its details.

The floor is fastened to the caps by drift bolts through each stringer piece. The track stringers are each composed of two 8-in. × 14½-in. timbers, held together by ¾-in. by 20½-in. bolts, and separated by cast iron separators or spools. The absence of jack or outside stringers is to be noted. It would, most undoubtedly, add greatly to the safety of the structure, while but slightly increasing the cost, were the ties made a little longer and a jack stringer placed under either end. The guard rails are notched on to the ties, 1 in., and the ties on to the stringers ⅝ in.

The posts of each deck are fastened to caps by mortise and tenon joint, while they merely rest upon sills, without even notching, being kept in place by two drift bolts to each post. The tenons are 8 in. by 6 in., and 4½ in. long with the corners champfered.

Each deck is divided into two stories by the sway bracing. The decks, though separated by purlins, are held together by drift bolts, two bolts being driven through the sill of the upper deck at the foot of each post, passing through the purlins and penetrating the cap of the deck below.

In all decks below the top one counter posts are introduced. These counters are inclined outward and are parallel to the batter post. All inclined posts have a batter of 3 in. to the foot. None of the inclined posts touch the plumb posts where they enter the cap, but are separated from them by a foot in the case of main inclined posts and 6 in. in the case of counters.

It is to be noted that the sway bracing instead of being all inclined in one direction on each side of the bent, as is frequently the case, is put on in a zig-zag fashion.

Wherever necessary longitudinal bracing is used, but it is specially designed for each case.

The foundation consists of piling, one pile being driven beneath each post. The sill of the bottom deck is fastened to each pile by a drift bolt.

Following is a list giving the dimensions of the different members:

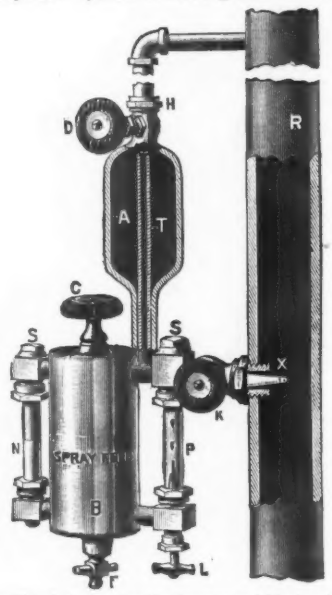
*Bill of Timber.*

| Name. | Size. |
|---|---|
| Floor system— | |
| Guard rail | 5 × 8 in. × 29 ft. |
| Ties | 6 × 8 in. × 10 ft. |
| Track stringers | 8 × 14½ in. |
| Top or first deck— | |
| Cap | 12 × 12 in. × 14 ft. |
| Sill | 12 × 12 in. × 22 ft. |
| Plumb posts | 12 × 12 in. × 20 ft. 2 in. |
| Batter posts | 12 × 12 in. × 20 ft. 10 in. |
| Sway bracing | 3 × 8 in. |
| Purlins | 8 × 10 in. |
| Lower or second deck— | |
| Cap | 12 × 12 in. × 22 ft. |
| Sill | 12 × 12 in. |
| Plumb posts | 12 × 12 in |
| Batter posts | 12 × 12 in. |
| Counter posts | 12 × 12 in. |
| Sway bracing | 3 × 8 in. |
| Foundation piles | |

## The Spray Feed Lubricator.

The sight-feed lubricator shown herewith is made by the Lunkenheimer Brass Manufacturing Co., of Cincinnati, O. The letters of reference on the engraving are: *A*, condenser; *B*, oil chamber; *C*, filling plug; *D*, condenser valve; *F*, drain valve; *K*, discharge valve; *L*, oil regulating valve; *N*, gauge glass showing the quantity of oil in *B*; *P*, sight-feed glass showing oil drops; *X*, spraying nozzle; *T*, steam supply pipe for forcing oil through nozzle.

The "spray-feed" system of feeding oil as used in this




"Spray-Feed" Lubricator for Stationary and Marine Engines.

lubricator consists in forcing the oil (after it has passed in drops up through the glass tube) into the steam pipe in the form of spray, thus atomizing and completely mixing it with the steam before it reaches the parts to be lubricated. This is accomplished by an independent current of steam, which passes through the pipe *T* and out of the spraying nozzle *X*. This lubricator is provided with a needle for properly guiding the oil drops as they leave the nozzle in the sight-feed glass.

It is claimed that this lubricator makes a saving of about 50 per cent. of oil over the ordinary sight-feed lubricator.

## Counterbalancing of Locomotives—Western Railway Club.

At the regular meeting May 20, the discussion of the subject of counterbalancing was continued.

Mr. W. H. Lewis: I wish to call the attention of the club to a little mis-statement which occurs on page 156 of the published proceedings of our April meeting, where I am made to say, "All of our locomotives are counterbalanced with the full weight of the reciprocating parts, etc." I intended to say that all of our class B, 10-wheel engines were counterbalanced as stated. It was not the intention to include class A engines in that remark. I think perhaps something might be said in regard to the methods employed in testing the proper balance of the wheel. You will notice in Mr. Barr's report [April Proceedings, page 160] that he speaks of the estimated weight of the hubs and pins. It seems to me that if the proper methods were employed in counterbalancing it would not be necessary to estimate the weights of the hubs and pins. Our method has been to rest the journals of the driving wheels on

* Copyright 1890, by W. C. Foster, and condensed from his forthcoming book on the same subject.

parallel strips, properly leveled, and when the counterbalance of the wheel is on the bottom quarter on one side sufficient weight can be added at the pin on the opposite side to rotate the wheel and bring the centre of the pin to a horizontal position. This will establish the true revolving balance in that wheel, and enable us also to ascertain that portion of the reciprocating weights in the counterbalance, by substracting the *known* weights of the revolving parts from the total weight suspended on the pin; the difference representing the portion applying to the reciprocating weights. After this is obtained, any portion of the weight of the reciprocating parts may be added. In this manner it is easy to determine the exact quantity of counterweight which you wish to apply to provide for any given rule for the amount of reciprocating weights.

President HICKEY: Did you find that the counterbalance in the wheel was equal to the weight of the reciprocating parts, including both rods?

Mr. LEWIS: No, this [referring to the weight he had placed on the pin] simply represents the revolving balance on the wheel. The model provided is simply to show the relative position of the weights and counterweights. Of course you make the addition of the reciprocating weights according to your own plans; this provides simply for the revolving parts—the adjustment of the weight of the rod and the weight of the pin. For instance, your rod weighs 107 lbs.; when you suspend 107 lbs. on that pin and it then balances, that would indicate simply the true balance; and then the reciprocating parts can be considered afterwards. When you determine upon what portion of the reciprocating parts you want to balance, you reduce your counterbalance or increase accordingly.

Mr. BARR: I have now about half a dozen engines that are pretty well counterbalanced to the limit of their reciprocating weights, and in five or six months I may have something to say on the subject. I would like, still, to insist upon the point brought up at the last meeting, viz.: That the left main driver on four-wheel connected engines has a great tendency on sandy roads to produce a flat spot at the point in contact with the rail just as the left pin is passing the forward centre. I have not got to the bottom of this fact yet. It is especially noticeable on sandy roads.

Mr. RHODES: We have watched the same point that Mr. Barr has, and are watching it now, and we have found the flat spot, as he states, but it does not appear always with the same class of engines. We may find it developed on one engine pretty clearly, and on another engine, built just like it, we may not; and that has brought up the idea in my mind that tires of certain grades are more susceptible to that flattening process than others.

Mr. BARR: Mr. Rhodes' observations are in the same line as mine. Engines running on a division that is not sandy may not develop flat spots, while on a sandy division the same class of engine will show the trouble very decidedly. But there is something that locates the flat spot on the left wheel, and that is what I think we ought to discover.

Mr. MACKENZIE: The question to me is, Why does the flat spot come, and why on the left-hand wheel? Would it not be well to find out how much of the reciprocating weight is carried by the engine developing the flat spot, and whether the weights are distributed unevenly in the different wheels?

Mr. LEWIS: Perhaps I did not make that point as clear as I might in my presentation of the subject at the last meeting; but I should have stated, if I did not, that every one of our class B engines (of which we have 15) developed the flat spot at the point indicated, and that after correcting the counterweight as given in the report, and running the engine ten months, the flat spot was nowhere near so great as it was in the case of engines the weights of which were not corrected. The position at which the tire is flattened is just as the left hand pin passes the forward centre. At a speed, of say, thirty miles an hour, the centrifugal force would be equal to a pressure of nearly ten thousand pounds, acting in the same direction as the power applied from the cylinder, so that you have not only the effect of the pressure of steam on the pin at that point, but you have also the centrifugal force of the counterbalance, causing a slight slipping of the wheel at that point. The question was asked at our last meeting why the flat spot developed on the left-hand wheel rather than the right, which Mr. D. L. Barnes answered by saying that the effect of the counterbalance on the right side in its upward gyration was to reduce the pressure of the right hand wheel on the rail, whie on the other side the angularity of the main rod produced a downward tendency on the wheel.

Mr. MACKENZIE: Why doesn't the back wheel flatten as well as the forward one?

Mr. BARR: The connecting rod does not press at that point. Supposing the main rod was perfectly horizontal, and the counterbalance here (indicating on model) was equally distributed below and above the centre line, there is no upward or downward force exerted from that counterbalance whatever, while on the opposite side the centrifugal force exerts a lifting influence on the wheel, and we have a tendency to lighten its contact on the track. When the counterbalance is down there is in general the greatest wear. The flat spot on the left hand tire occurs when the counterbalance in that wheel is horizontal; therefore, the centrifugal force in no way effects the wear.

Mr. BARNES: It seems to me that the difference in the amount of flat spots will occur when there is a difference in amount of pressure on the rail.

President HICKEY: I would ask Mr. BARR if he has noticed the flat spots on the back wheel, as well as on the front one, at that point?

Mr. BARR: In a great many cases I could not find any indication whatever of wear on the back wheel. In a few cases I thought we could, but it was very indefinite.

President HICKEY: Did you find any on the right-hand wheel?

Mr. BARR: Sometimes on the right-hand wheel there seems to be a little indication of wear.

President HICKEY: Has the wear been noticed to any greater degree on engines that have been poorly counterbalanced?

Mr. PECK: I notice it in a class of engines that are very well counterbalanced.

MR. WILLIAM FORSYTH: There is one part of the subject of counterbalancing that I think might be taken up especially with respect to the whole engine, which would probably do some good on any road where there are many old engines. The process of balancing has gone through a great many stages; and it is probable that in some cases the front wheels have been exchanged for the back wheels, for the convenience of some shop manipulation. Then, again, the practice of different Master mechanics is very different. They all have their own notions, and you find on some roads that there are two or three different rules in regard to counterbalancing. The result is that engines from one shop may be underbalanced, while the engines from another shop may be over-balanced. This thing goes on until some day an engine that is largely over-balanced attains a speed of 60 or 65 miles an hour, and the destructive effect of this extra over-balance is then observed, and it is brought to the attention of the general office. Now, we have found that in straigtening out a matter of this kind it is a good plan to issue a blank with headings, giving the name of each wheel—the front, back or middle wheel. Then on the longitudinal columns give the weights of roo or reciprocating parts. If you make up your weights which shall be proper for a certain engine, and then have a convenient arrangement in the shop by which to get the actual weights that are in the wheels, and make a record of that, then this blank will show the weights in the wheels and the difference. Then have a certificate from the master mechanic saying that the weights have been balanced corresponding to the correct calculation. I have reports of this kind, I suppose, from 400 engines, and you would be surprised to know now many thousands of pounds of iron have been exchanged—how much taken out and how much put in.

Mr. BARNES: What we are looking for in regard to flat spots is not for their simple existence, but for the difference in them. Flat spots themselves result from a different amount of turning moment on the drivers, and different amount of load on those drivers during a revolution. But the difference in the flat spots on the driving wheels at different ends of the same axle does not seem to be settled by the discussion.

## Journal Boxes—Western Railway Club.

At the meeting of the club held May 20, several subjects were considered. The discussion on counterbalancing appears under another head. At the second session of the meeting Mr. J. N. Barr assumed the chair. The subject of journal boxes was taken up and Mr. F. B. H. Bontor, of Chicago, representing the Hammond car axle box, a device for retaining the oil in journal boxes, was requested to explain its principle. He explained it, assisted by a working model, as a hollow pin carrying a second pin which bears down upon the journal between the brass and sand board. The pin wipes the oil back, and throws it into the waste-box—the object being to prevent the oil from working out on to the wheel. The device had never been thoroughly tested. It could be applied to any standard box.

Mr. VERBRYCK (In reply to a question about the Sharpneck box): We have been trying that box on our road. The 3d of last July we equipped one train, consisting of baggage car, smoking car and two coaches with the device, and it has been running since that time without any trouble at all. We have changed wheels frequently, because of usual defects, but we couldn't heat the journals. The last time we had the cars in we examined the journals and rollers, and the wear was almost imperceptible. I can testify that the device is a success, so far as running is concerned. As to the question of cost, that is an entirely different thing. The boxes are rather costly as they have been manufactured; but I presume that if the Sharpneck Co. manufactured them regularly, they could bring the cost down. The Sharpneck Co. furnished us the rollers and axles. The boxes take a little longer journal than our standard journal, and consequently they furnished the axles. All we manufactured was the box and pedestal.

Mr. R. D. SMITH: We have found in our ordinary boxes that the brass wears very much thinner at the back end than at the front end. In speaking of this I mean the brasses that are fitted with the Bissel stop wedge. We have found them to wear to such an extent that when the inside of the brass would be worn down to half an inch thick, the lead would not be worn down at the outside. In looking the matter up it was thought that the pedestals were out of square, and that caused the uneven wear. We squared up the pedestals but that did not seem to remedy the trouble. We then took some cars that had just come from the shops, the pedestals of which we knew to be perfectly square; and, after two trips, found that the brasses were worn all out on the inside, and not at all on the outside. I believe what we want is a journal box that will feed clean oil to the journal.

Mr. VERBRYCK: I would like to ask Mr. Smith if he got the width of his trucks just right, and if he had the bearings just over the centre of the axle, or not?

Mr. SMITH: The trucks, as fitted up, are pedestal trucks, with an equalizer bearing within an inch of the center of the axle.

Mr. VERBRYCK: Which way is it from the centre?

Mr. SMITH: The centre is to the outside.

Mr. VERBRYCK: I have found in my experience that to throw the equalizer $\frac{3}{16}$ in. off the centre is just enough. Theoretically, directly over the centre is correct, but practically it is not. After considerable experiment I finally found that throwing the equalizing bearing forward of the centre was just right.

Mr. SMITH: I don't think throwing it out $\frac{3}{16}$ in. or $\frac{1}{4}$ in. would make much difference. We find that the wedge is from $\frac{1}{4}$ to $\frac{5}{16}$ in. from the shoulder of the box, which would allow it to move considerably. The last thing we have done is to take the Bissel brass and plane off $\frac{1}{16}$ in. toward each end, which gives it a crown, and leaves a bearing right in the center. I have some brasses thus cut on trial now.

## TECHNICAL.

### Manufacturing and Business.

The Marion Steam Shovel Co., Marion, O., received orders last week for a large ditching dredge and several ballast unloaders, and for four of its largest size steam shovels. One of the dredges will be shipped to California and the other to Indiana. Fogg & Scribner, of New York City, ordered two of the shovels, and the New York, New Haven & Hartford ordered the other two, which makes four shovels of this size that company has ordered. The firm has recently shipped a second steam shovel to the Pennsylvania road, a third to the Missouri, Kansas & Texas, and others to the Atchison, Topeka & Santa Fe, Illinois Central and Knoxville, Cumberland Gap & Louisville roads, and to the Union Brick Co. and E. Harland & Co., of Chicago; Castle & Massey, of South Chicago; John A. Kelly & Co., Philadelphia, and Booth & Flinn, of Pittsburgh.

The Hinson Car Coupler Co. held is annual meeting at Des Moines, Ia., last week. It was reported that the sales of car couplers during the past year had amounted to 18,280, and that the breakages during the same period had been but a fraction of 1 per cent. The directors were authorized to arrange for the manfacture of the coupler in the East and South. The company is now employing six travelling salesmen to introduce the coupler. The stockholders elected as directors: F. G. Kammerer, J. E. Forsyth, John R. Walsh, M. S. Bannister, David Secor, J. A. Hinson, W. R. Ankeny and William Christy, with the following officers: F. G. Kammerer, Chicago, President; J. A. Hinson, Des Moines, Vice-President; John R. Walsh, Chicago, Treasurer, and William Christy, Des Moines, Secretary, and David Secor, Winnebago City, Minn., General Manager.

The Mason Regulator Co., of Boston, has recently received orders from the Chicago, Rock Island & Pacific, for 36 of its air-brake regulators, from the Pennsylvania for 12, and from the Eames Vacuum Brake Co. for 18.

The Stone & Weiskopf Co., of Pittsburgh, Pa., has recently sold to the Terre Haute Car & Mfg. Co. 2,400 of the Stone patent oil cellar bearings for 300 cars the company is building. The Stone bearing has also been specified on other recent large car orders.

The new buildings of the Daniel E. Paris Stove Co., at Sioux City, Ia., will be built of iron by the Berlin Iron Bridge Co., of East Berlin, Conn. The foundry building will be 155 ft. wide by 350 ft. long, the mounting room 87 ft. wide by 225 ft. long, and the boiler, engine and plating room 50 ft. wide by 196 ft. long. The Berlin Iron Bridge Co. also has the contract for the new foundry building for the Waterbury Farrell Foundry & Machine Co., at Waterbury, Conn.

An officer of the Standard Oil Co. gives the following companies as among those near Chicago which are using crude petroleum for fuel: The Illinois Steel Co., Chicago Steel Works, Calumet Iron & Steel Co., Chicago Drop Forge & Foundry Co., Chicago Forge & Colt Co., Chicago Tire & Spring Co., Crane Bros. Mfg. Co., Fowler Rolling Mill Co., and the Pullman Palace Car Co.

The Greenlee Foundry Co. has been chartered in Illinios with a capital stock of $100,000 to carry on a general foundry business. The incorporators are: R. S. Greenlee, R. L. Greenlee and R. W. Russell. Greenlee Bros. & Co. have also been incorporated to manufacture wood-turning machinery, etc. The capital stock is $300,000. R. S. Greenlee, R. L. Greenlee and R. W. Russell are the incorporators.

The Upson Nut Co., of Unionville, Conn., is rapidly completing its buildings to replace those destroyed by fire recently.

The Gearon Metallic Railway Track Sleeper Co., of Chicago, has been organized in Illinois to manufacture a patent track sleeper. H. V. Slutz, Thomas Dorwin, and Isham Randolph are the incorporators.

The South Tredegar Iron Works, of Chattanooga Tenn., have added a track bolt and nut plant, the machinery being supplied by the National Machinery Co., of Tiffin, O.

### Iron and Steel.

The Crescent Foundry of L. Wertheimer, Allegheny, Pa., has recently received the contract to supply the Philadelphia Company with 4,500 flanges for 36 in. riveted pipe.

The Pennsylvania Steel Co. is using at the Steelton Works a blowing engine for the Bessemer department which has several interesting features. It is a high-speed compound engine, the air valves being opened and closed by a positive movement operated by an air cylinder.

The firm of Samuel Trethewey & Co., Ltd., of Pittsburgh, manufacturers of steam hammers, solid steel shear knives, etc., has been changed to a chartered company, and will be known as the Trethewey Manufacturing Co.

The Standard Oil Co. recently placed an order for $250,000 worth of pipe with the Oil City Tube Co., of Oil City, Pa., and the Pennsylvania Tube Works, of Pittsburgh.

The Crane Elevator Co. is putting in steam hoists of from 1 000 to 1,500 tons daily capacity for the following firms: Jones & Laughlin, Laughlins & Co., the Isabella Furnace Co., Pittsburgh, and the Cambria Iron Co., Johnstown.

The car axle department of the Anniston works of the United States Rolling Stock Works has, it is stated, received an order for 16,000 axles, to meet which the capacity of the plant will be doubled.

Howe, Brown & Co., of Pittsburgh, Pa., will add a Bement & Miles steam hammer to their hammer department.

### The Rail Market.

*Steel Rails.*—Up to May 1 the sales reported were 1,020,023 gross tons, and the deliveries to that date aggregated 464,211 tons by the reporting mills. The quotations in the East are nominally $31@31.50; at Pittsburgh, $31@$32, and at Chicago, $35.

*Old Rails.*—Sales have been made in the East at $23 for Jersey City delivery; at Pittsburgh the quotations for old iron rails are $24.50@$25, and for old steel rails, $20@$21 and $22@$22.50. At Chicago old iron rails sell at $22.50@$23, and old steel rails at $20.50@$21.

### An Important Decision Affecting Brake Shoes.

A decision was rendered May 26 in the United States District Court, Eastern District of Michigan, Brown, Judge, in the case of the Consolidated Brake Shoe Co. and others *versus* the Detroit Steel & Spring Co. The suit was brought to prevent infringement of the Ross patent by the manufacture of flanged shoes for the Chicago, Burlington & Quincy. The decision was upon a motion for a preliminary injunction. The defense was based on old English patents of James Steel, and experiments with that patent on the Burlington road. It appears that investigations by the Eastern and Western Railroad Associations had failed to develop any evidence supporting the position of the Detroit Steel & Spring Co., and the injunction restrains the defendants "from making, selling, using, or causing to be made, sold or used; and from furnishing, delivering, advertising or offering for sale, any brake shoes provided with grooves or recesses to substantially cover the tread of the rail upon the wheel and with grooves or recesses to substantially cover the flange of the wheel, and having also a portion or projection between said grooves or recesses which projects down on the wheel into the throat between the flange and the thread of the wheel." It would thus seem that the Consolidated Brake Shoe Co. and its licensees are the only ones who can legally make and sell the "flanged brake shoes" described.

RAILROAD GAZETTE

Published Every Friday,
At 73 Broadway, New York.

## EDITORIAL ANNOUNCEMENTS.

**Contributions.**—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

**Advertisements.**—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

We publish to-day the second of a series of articles on wooden trestle bridges, by Mr. W. C. Foster. It is expected that these will appear as often as every other week for some months, and eventually they, together with many examples and much matter that we shall not publish, will be collected in book form. The articles which we shall publish will illustrate a great variety of practice, and the series when complete will fill a serious gap in the literature of the profession.

It was announced on Wednesday that Northwestern passenger rates would be restored on June 10, an agreement having been signed in Chicago the first of the week and then brought to New York for the signature of the Chicago, Milwaukee & St. Paul, which was affixed on Wednesday. No details are given, though our Chicago report indicates that they have been carefully considered. The important point seems to be that the Wisconsin Central withdraws, or at least holds in abeyance for 30 or 60 days, its demand for either a differential fare or an agreement as to speed of trains between Chicago and St. Paul. New York reports say that the Southwestern roads, where the largest revenues are being sacrificed, have not yet come into the agreement, though they are likely soon to do so; but the Chicago dispatch indicates that they have come in.

The discussion of safety-appliance legislation on Wednesday afternoon at the National Convention of state Railroad Commissioners was an encouraging thing to listen to. It was not that the Commissioners had learned much about safety appliances, but they had learned quite a number of things about legislation, and showed an amount of sense on the subject which seemed unattainable a few years ago. The same views which were so well expressed in the last report of the Interstate Commerce Commission concerning the dangers of over-legislation found not a few sympathizers among the state Commissioners. The plan which was so popular a few years ago, by which a commission would select certain specific couplers, found no advocates. As one of the delegates said, "We don't want forty-two different kinds of uniformity." There was only one man in the whole discussion who stood on the ground which was generally occupied half a dozen years ago. The only real question in the debate was whether the resolution should say "an approved type" or "the Master Car Builders' type." Here again the more sensible view prevailed. It was seen that if the words "an approved type" were used, somebody would have to approve it, and that particular somebody, whoever he might be, was less likely to be wise and disinterested than the Master Car Builders. "Which knows most about car building," said the same delegate, whose speech was already quoted, "we, or Congress, or the Master Car Builders?" And the convention concluded that the Master Car Builders did.

Two propositions have been introduced into the United States Senate modifying the law against pools. That of Senator Dawes allows such agreements, provided they are found by the Interstate Commerce Commission to contain nothing contrary to the requirements of the Interstate Commerce Act. Senator Cullom's proposition contains the further restriction that no shipper shall be prevented from selecting a route in case he chooses to do so; in other words that no man's freight shall be diverted against his will. The limitations proposed by Mr. Dawes are perfectly just and right. One great reason why we want pools allowed is because rates can be maintained better with them than without them. They are a means for the enforcement of the law, rather than its evasion. Only when the public learns what the purpose of the railroads really is, will it be ready to permit pools. If the railroads are perfectly satisfied with pooling under legal restrictions, the public will quickly learn the true state of the case; if they oppose such restrictions, the public will continue to think that they mean mischief. With Mr. Cullom's proposition the case is somewhat different. In the majority of cases it would do no harm; but it might sometimes make serious trouble. Take, for instance, the dressed beef matters in the fall of 1887. The shippers were few in number and well organized; they precipitated a war by throwing their whole traffic first upon one road and then upon another. In order to prevent such troubles when large shippers can act as a unit, it is necessary and right for the roads to have some powers of self-protection. It is just that they should offer a slightly lower rate for freight which can be shipped by any line whose equipment is standing idle, than for that which must go over one specified line. If a man deliberately chooses a method of shipment which may, and sometimes does, involve bad railroad economy, it is no discrimination to compel him to pay for it. But in any event, the partial abrogation of the pooling clause, under whatever limitations it might be made, would be a most decided gain as compared with present conditions—especially to Mr. A. F. Walker and the Interstate Commerce Railway Association.

We have many times reminded managers of their shortcomings in the matter of time tables, and have spoken with various degrees of severity, from the mildest to the utmost degree of harshness, compatible with a proper state of good nature, which we, of course, never fail to maintain. And as we have sometimes been upbraided for using too vigorous language, it is a pleasing change to find an occasional complaint in the other direction, such as that printed in another column. The trouble with time tables seems to spring from the same causes that impair the value of much other work done in superintendents' offices, the undertaking of a complicated and difficult work when there is not sufficient time for doing it properly. The circulars announcing corrections, which we see so frequently, show that the proofreading of time tables is done too hastily. Although a fixed date for sending out the tables for the public would compel the adoption of different methods or the assignment of a larger force of clerks to the work, we are not sure but that superintendents would, after getting used to it, be glad that a little compulsion had been used, as has been the case with other disagreeable things prescribed by law before now. The less frequent issuance of passenger rate sheets, which has lately been successfully accomplished, is an example of what is possible in such affairs. All that is really required is a little combined courage and persistence. The point concerning the destruction of old tables at the proper time is well taken. It may be questioned whether any road would derive any benefit from such care-taking so long as all competitors are in a like situation, and in view of the fact that pocket time tables are sown broadcast where no amount of effort can prevent people using them. We think it would, however, pay a road to post tables, in large print, in all hotels and other places where the public would most appreciate them, and affix to them a notice stating in plain terms that

> "*Any change in this time table will be plainly announced in this frame .... . days before it is to take effect.*"

This principle should also be applied to the standing advertisements in the daily newspapers. It is very annoying to know that a change is to occur on Sunday, and yet to find in the Saturday evening paper nothing but the old table. Both the old and the new might be printed for a few days. We are glad to note on a number of roads an increasing carefulness in properly notifying the public of intended changes. We hope the failure of their "slow" neighbors to promptly follow their example will not deter them from carrying the improvement still further.

### Standard Rail Sections.

The principal argument in favor of a set of standard rail sections is that of economy. It would doubtless make rails cheaper if the mills could reduce the number of rolls carried, run longer without changing and roll for stock. It would often be advantageous both to buyer and seller if small orders could be promptly filled from stock on hand. The chief arguments against fixing standards are (first) that not enough is known of the wear of recent favorite sections, and (second) that the adoption of standards would arrest experiment and investigation. As bearing on all of these arguments, we have taken the pains to get an interesting group of facts out of the section books of several of the rail mills.

Taking four large mills, we find in 60-lb. rails alone 24 different sections in considerable use. Probably half as many more are rolled occasionally; but we have selected those that are so generally used that they cannot even be considered obsolescent. One mill has rolls for eight sections of 60-lb. rails of this class. These are for four mills only. One of the largest mills has no book of sections now in print, but were its sections obtainable the number of designs of current 60-lb. rails would be considerably increased. It is inconceivable that the difference of conditions on different roads can require such a variety of sections of one weight. There can be no question that, by reasonable concessions and compromise, the patterns of 60-lb. rails could be reduced to four or five, or even less, and all peculiarities of local conditions provided for.

If one attempts to analyze these sections with a view to ascertaining the dimensions most in use, he is struck by the immense variety of combinations of the different dimensions. Designers seem to have taken delight in introducing odd thirty-seconds and sixty-fourths; and each one has apparently tried to depart at least $\frac{1}{16}$ in. in almost every dimension from any other section in use. In the height of rail, the breadth of base, and the radius of the crown there is some approach to uniformity. The height in these 24 sections varies from 4 in. to $4\frac{13}{32}$ in. There are 15 of $4\frac{1}{4}$ in. and four of 4 in. The base varies from $3\frac{7}{8}$ in. to $4\frac{9}{32}$. There are seven sections of $4\frac{1}{4}$ in. base and four of 4 in.; the rest scatter all over the range between the maximum and minimum limits. There are such widths as $4\frac{5}{64}$, $4\frac{1}{32}$ and $3\frac{15}{16}$ in., and one of 4.04125 in. Such refinements are pure nonsense. It seems as if they had been introduced out of cussedness, for no man can defend them by rational arguments. In crown radius there is much less finniky variation than in any other single dimension. The range in the 24 sections is from $4\frac{1}{8}$ in. to 12 in. There is but one example of the $4\frac{1}{8}$ in. radius. There are two of 12 in., 11 of 10 in., three of 9 in. and two of 8 in. The depth of head, from the top of the crown to the intersection of the fishing faces, varies from $1\frac{13}{32}$ to $1\frac{9}{16}$ in., and pretty nearly every sixty-fourth of an inch in the included range has its advocate. It should be noticed that the recent shallow-headed section is not represented in the current 60-lb. rails, the few sections so far rolled of that pattern being considerably heavier. It would be a waste of time to follow this group of sections through the other dimensions.

We have so far considered only the 60-lb. sections. To get a proper conception of the variety of rolls that the mills must carry we should examine the sections from 56 lbs. up to 85 lbs. There were probably more rails rolled last year of greater weights than 60 lb. than of that weight and less. Messrs. Carnegie Brothers & Co. are of the opinion that the average section of last year as rolled by all mills was between 63 and 65 lbs., but of the heavier sections there is no one weight rolled in such great variety of patterns as the 60-lb.

The variety of weights of sections is nearly, if not quite, as unnecessarily great as the variety of patterns. In the section books of the same four mills that we have considered we find 29 different weights between 56 and 85 lbs., inclusive. We find 58, $58\frac{1}{4}$ and $58\frac{1}{2}$-lb. sections. Again, there is a series of sections for each half-pound from 60 lbs. up to $63\frac{1}{2}$ lbs., and we find 66, $66\frac{1}{4}$, 67, 68, $68\frac{1}{2}$ and 69-lb. sections. Obviously there can be no good reason for these small differences in weight of sections. If a $62\frac{1}{4}$-lb. rail is suitable for a given service, the chances are that either a 60-lb. or a 65-lb. rail will be equally fit. If a 60-lb. rail is too light for the service, it is pretty certain that one of $62\frac{1}{4}$ lbs. will also be too light. To calculate within $2\frac{1}{4}$ lbs. per yard, the most economical and efficient section for any given traffic and roadbed involves more accurate knowledge of the conditions and their relations than it is possible to have.

We have not taken the time to ascertain the number of sections of each of the 29 different weights between 56 and 85 lbs. per yard. Leaving out the 24

sections of 60-lb. weight, we may assume that each of the 28 remaining weights is made in three different sections. Probably this assumption is too low. There are in the four section books examined about 10 patterns of 70-lb. sections, and 70-lb. rails are of comparatively recent use and have not been fooled with by so great a number of designers as have the lighter sections. Assuming, then, that the average is three sections for each of the 28 weights between 56 and 85 lbs. (leaving out the 60-lb. sections), we have for these, 84 sections. These, with the 24 sections of 60-lb. rails, give 108 sections for which rolls must be carried by the four mills. But they have to roll still other sections in these weights, of the obsolescent patterns, to fill orders for frogs and switches.

Now, if seven different weights were used, increasing by five pounds from 55 to 85 lbs., inclusive, and if there were four sections made of each weight, the total number of sections would be at once reduced from 108 to 28, and an immense step would have been taken toward uniformity and economy. There would still remain a sufficient variety of weights and designs to suit all possible conditions of practice and to permit all useful experiment.

In fact, the present state positively retards investigation. The confusion of designs is so great that it is very difficult to draw conclusions from the experience of different roads. The most that can be done is to compare the results from types of sections, and there can hardly be said to be any sharply defined types. In general, we may say that it has been demonstrated that it was a mistake to increase the depth of head and decrease the thickness of web and flange, as was very generally done a few years ago. It has been shown to be very probable that not more than 42 per cent. of the total metal should be in the head, and quite possible that even better results will be got if this is reduced to 40 per cent. It has been shown to be probable that the crown radius should be at least 12 in. It is coming to be admitted that it was a mistake to flare the sides of the head outward (going down from the top), and that the upper corner radius has generally been made too long. It cannot be said, however, that these last are demonstrated facts. Beyond these conclusions there is a vast mass of unclassified and unclassifiable experience as to the best relation between weight, height and width of base, not to mention the smaller dimensions of the hundreds of current sections.

If it is possible to agree upon a few sections of several types, and to bring them into large use, not only will there be relief to the mills, but the experiences of users of rails will become comparable, which now they are not except in the most general way. Probably such an agreement will soon be possible even if it is not now. There is an evident tendency toward uniformity. Messrs. Carnegie Brothers & Co. write: "The tendency is not only toward a heavier section, but also drifting rapidly to fewer patterns. About one-third of the rails we roll annually now are of the Pennsylvania standard 56, 60, 67 and 70-lb. sections." It seems probable that a series of sections recommended by the American Society's Committee, if it included two or three types, would gradually drive out the great mass of sections differing from each other only in minor dimensions. This would advance matters by making it possible to get conclusive comparisons of the service of different types; but the relief to the mills might not be felt for some time, because enough roads would still stick to their individual designs to keep in use a great diversity of sections.

## Keeping a Good Lookout on Engines.

A correspondent in another column calls attention to the added possibilities of danger to trains introduced by the modern forms of cab used on the engines having Wootten fire boxes and on other forms, in which the boiler occupies the principal portion of the space formerly allotted to the engineer and fireman. These cabs are familiar to our readers, and we need not add any words to impress the point made by our correspondent. We believe that in the disaster at Little Ferry there were three men on the engine, all of whom were killed, and we do not know but that all three of them ought to have taken some pains, individually, to look for the signal; that is, the rules may have required the fireman to watch for fixed signals, especially at so dangerous a point as a drawbridge. It is also to be remarked in connection with a paragraph in our correspondent's letter that a brakeman should not be depended upon as a lookout-man in the engine, as his duties most of the time are elsewhere. A road in Western New York recently issued strict orders to brakemen to keep off the engines, two employés needlessly riding on an engine having been killed by a boiler explosion.

There is no question that the lookout on an engine should be maintained at the very highest state of efficiency. The expense of two or even three men to watch for danger ahead is not to be compared with the value of the two or three hundred lives often dependent on the safety of a passenger train running at a high speed. The United States regulations concerning ferry boats now require that there shall be two men in the pilot house at all times when the vessel is in motion. To see one of these boats, crowded with humanity almost to the very edge of the deck, as it approaches a slip, where a slight mistake in steering might result in precipitating a dozen or a hundred persons into the river, one would make no question that the salary of the extra pilot is a small price to pay for the absolute safety of so many lives and so much property. Reports of cases of sudden death in a pilot house and the consequent drifting of the vessel will be recalled by most readers, though we do not recollect a definite case of positive damage or personal injury from this cause. Locomotive runners have fallen in fits or have otherwise become unconscious without warning; but cases of actual disaster are rare or unknown for the reason that the fireman has generally looked out for the safety of the train. We do not recollect to have heard of any authenticated case of the failure of an engineer on one of the new style cabs, but from past experience it seems likely that such cases will occur sooner or later. But even when a runner who is alone faints or drops dead there is a chance that no harm to the train will ensue, so that the liability of death or injury to passengers is somewhat remote. Of course, the possibility of danger to a trainload of passengers is as horrible to think of as is the case of the ferry boat just cited, although the spectacle does not appeal to the imagination quite so vividly, and the elements of danger present themselves in a different shape.

But while railroad managers understand all this and are ready to bear the expense of a third man on on engine, if such a safeguard is really necessary, the question at once arises, Would the additional watchman actually save any lives or property? We have heard that one road has seriously considered the question of putting a third man on its engines (presumably only passenger engines), for the sole purpose of keeping a lookout; that is, a man to watch the signals and stop and start the train, while the engineer gives his whole attention to the mechanical management of the engine. Whether this is in consequence of the unfavorable position that the fireman is placed in by the long fire boxes now used, we do not know, but at all events we do not learn that the pilot has actually been put on.

The liability of disaster to a train from the mental failure of the engineer being so very remote, the question of expense may fairly be regarded as an important one. It could be very plausibly argued that the $2 or $3 per 100 miles necessary to place an additional man on each engine could be made to promote the safety of passengers much more effectively by being spent for some other improvement. Passengers are killed and injured by a great variety of preventable causes, and most railroad managers feel a crying need of money with which to carry out their plans for removing these causes. Engineers run past signals every day without observing them, even when they have a fireman at their elbow, and managers would like large sums of money with which to provide signals which will arrest the attention of men who are "absent-minded," in the ordinary sense of that term. Rear collisions occur because engineers who are *not* dead, nor even in a fit, will run past red flags and lanterns; managers, therefore, want money to spend for block signals. If, therefore, it is a question of putting on another man, we may well ask whether we should not first see whether the man can fill his place. Engineers die on the engine, perhaps once in a billion or a quadrillion of train-miles; but they become careless and overlook signals every few thousand train-miles. Is not the latter the most important point to guard? A man who would probably die of old age himself before he detected the engineer in playing any trick of that kind might well seek another field of usefulness. Street cars are run under the control of a single man, especially since the advent of cable and electric roads, amidst surroundings perhaps more dangerous than those of the ordinary railroad train. One of these cars gets into trouble at a railroad crossing every few weeks or months. It is quite likely that but for the fact that there are necessarily two men on a locomotive, people's views as to the necessity of a provision against the sudden death of the engineer would have been quite different from what they are.

While, therefore, a second man, to grasp the throttle the instant the regular runner fails, is every way desirable, and while the abolition of the time-honored safeguard provided by the presence of the fireman within three or four feet of the engineer is a change which railroads should not make without deliberation, we may well regard the present problem as resolving itself into the question, How far can a fireman act as a monitor toward the engineer in practical every-day service?

It is imaginable that a fireman and an engineer 20 ft. apart, and surrounded by noises preventing their speaking to each other except with difficulty, could arrange some sort of a code of signals, or at least some understanding between each other, by which with the aid of electrical wires, mirrors, or other accessories, the mental or physical failure of either one might be made known to the other; but such theories can hardly be said to merit much attention, for the reason that, however good they may be, no ordinary pair of men would faithfully use them. It is not in human nature to give constant care and attention to the exercising of a safeguard whose value is evident only in very rare emergencies. It is difficult to get a fireman to act as a check on an engineer even when the two are within three feet of each other, with no hindrance to communication except the noise. Engineers run past fixed signals without seeing them, when the fireman might have prevented the blunder, as well as not, except for his listlessness or his fear of injuring the engineer's pride by calling his attention to lapses of memory or judgment. Whenever an engineer runs past a danger signal, and the fireman is questioned about it, the answer is almost sure to be that he "was shoveling in coal just then." It follows from this that, to get any valuable service out of a second man on an engine, he must be charged with the performance of a certain set of positive acts regularly. The most practicable way of doing this is by requiring the fireman to observe all fixed signals and to speak to the engineer on sighting each signal. It is possible to regulate the observance of this rule, and to detect habitual disregard of it. When firemen, generally, have been brought up to this degree of efficiency, we may then begin to consider the placing of additional duties upon them. This regular observance of fixed signals by firemen could be carried out on "hogs" and "dirt-burners" as well as on old style engines, and it might be well to try it a while before taking further action in the matter. When it has been shown just what a pilot is good for the question of employing them can be intelligently considered. If they do nothing but watch for the engineer's death, after the manner of the Niagara coroner who patiently waited beside the whirlpool rapids to see Mark Twain go under, they would be equally valuable with those mechanical safeguards which, when needed, are found to be inoperative from rust or other deterioration. It is true that sitting on the left-hand side of the engine and gazing constantly upon the engineer, or keeping a constant lookout ahead, might be regarded as positive acts, but as there is no check by which the superintendent can know how faithfully they are attended to, it may be questioned whether it would be profitable to require them, even if they cost nothing.

## The Diamond Shoal Light-House.

An engineering work of great importance and interest will shortly be undertaken. The Light-House Board will soon receive bids for building a light-house off Cape Hatteras on Outer Diamond Shoal. This is notoriously one of the most dangerous places for navigators on the whole Atlantic coast, but it is also one of the most hazardous and difficult places in which to build a light-house. The reasons which make the point so dangerous are precisely those which have up to this time prevented the establishment there of any signal.

The present state has been reached after long consideration. In 1882 Congress was petitioned to establish a lightship on Diamond Shoal. Officers of the Light-House Board reported adversely to this proposition. They said that it would be simply placing a lightship in a position to cause continued loss of life. The extremely severe gales from the south and east would cause the lightship to break adrift and no earthly power could prevent every soul on board being lost on the shoals to leeward. A lighted buoy was recommended, and for temporary use it was suggested that a whistling buoy should be placed in position. In 1883 the Naval Secretary of the Light-House Board said that it would be impossible to keep a lightship in the position named. The board had already placed off Cape Hatteras three whistling buoys, moored with as heavy chains as they could carry, of sufficient weight to hold a vessel, but it had been impossible to keep them in position. The chains were chafed by the constant wear against each other owing to the incessant running of the seas. The Board concluded that it would be even more impos-

sible to maintain a lightship than a buoy, and again reported that it would result in inevitable loss of all on board when the ship should go adrift. In the same year Major Babcock, U. S. A., Engineer in charge of the Fifth District, made an examination of the shoals with a view to the establishment of a lighted beacon. He waited his opportunity and went out on a quiet June day with but little wind blowing. He found such a swell running that it was unsafe to take the tender close to the shoal, and mooring was impracticable. He was satisfied, however, from his talks with pilots and other people familiar with the coast that there were many days during the summer months when the wind is blowing off shore and the sea quiet, in which a vessel adapted to the work could go close to the edge of the breaker and work for many hours at a time. He was of the opinion, therefore, that it would be practicable to place a beacon or a light-house on the outer diamond shoal, but that its construction would be expensive and attended with danger. He suggested building out a long pier from a point on the inside of the shoal, from the end of which the foundation work for the light-house could be carried on. In his opinion the chief reason for the great expense would be the loss of time in waiting for suitable weather and the almost *inevitable loss of material* during the progress of construction.

The probability is that when the work is carried out it will be done by the method adopted in building the light-house on Fourteen Foot Bank, 20 miles off Lewes. There a caisson 40 ft. square was built, the bottom temporarily floored over and it was sheathed and pitched to make it water tight, and launched. Then the tower structure was began. When the whole structure, caisson and tower, was about 30 ft. high it was towed 20 miles out to sea and sunk. The displacement of the structure when towed out was about 400 tons and its draught 15½ ft. In grounding the caisson the greatest danger of loss occurred. The scour of the currents was great and the caisson sank unevenly; at times it was 12° out of the vertical. Fortunately the contractors were men of great experience and resource and they succeeded in righting the caisson and carried the work through to a successful conclusion. Had they been men of less skill or with less command of means they might have suffered as did the contractors for the Rothersand light-house at the mouth of the Weser, in the North Sea. In this case the contract was taken at a low price, by a company without experience in work of the kind. When about 85 per cent. of the work had been done it was completely wrecked. It is estimated that the risks of the work off Cape Hatteras, as compared with those at Fourteen-Foot Bank, will be about as 3 to 1. In the former case the caisson will have to be towed over a bar when there is but eight ft. of water. But as it will draw from 15 to 20 ft. it must be lifted over the bar by pontoons or other means. The shoal on which the structure will stand is a sand spit, and the seas are so constant and heavy as to make even the preliminary boring difficult, so that it is not known to what depth the foundations must be sunk. We have recited these facts in order to give some notion of the great difficulty and risk of building a light house at this point. It is evident that the contractor must be prepared to lose at least one caisson.

In 1888 a bill was introduced in Congress appropriating $500,000 for the work. This bill provided that the contractors be selected by reason of skill, experience, possession of plant and control of means to do the work. The bill as passed was without this clause, and under the law the work must be let to the lowest bidder. The Chairman of the Light-House Board asked that the clause be retained. He said that while letting to the lowest bidder had in the main worked advantageously for the Government, in work of a special character, "requiring the experience and skill of experts, and adequate plant and capital, it had worked injuriously to both the Government and the contractor." He cited several examples of this, and said that "the proposed work off Cape Hatteras is the most difficult and dangerous of the kind ever attempted by the Government." Nevertheless the contract must go to the lowest bidder. Moreover, the work will be entirely at the contractor's risk for one year after its completion. Under all the circumstances one would suppose that the bidders would be few, but there is a great class whose temerity is proverbial.

## The Railroads of the World.

The current number of the *Archiv fur Eisenbahnwesen* contains its annual summary of the world's railroad mileage, bringing the figures down to the beginning of 1889. The general results, as compared with those of four years ago, are as follows:

| | Dec. 31, 1884. Miles. | Dec. 31, 1888. Miles. |
|---|---|---|
| Europe | 118,600 | 133,900 |
| America | 149,600 | 190,000 |
| Asia | 13,200 | 17,800 |
| Africa | 4,000 | 5,200 |
| Australia | 7,600 | 10,500 |
| Total | 293,000 | 357,400 |

Of the increase of 64,000 miles during the four years, 40,000 is in America and 30,000 in the United States alone. Eleven thousand miles were opened in 1885, 17,000 in 1886, 23,000 in 1887, and 13,000 in 1888; showing that the changes in rapidity of railroad construction in this country have been closely followed in other parts of the world.

Inasmuch as the detailed figures of the *Archiv* are frequently quoted as authority, we shall give them in *kilometres*, without reducing them to miles:

| *Europe.* | Dec. 31, 1888. Kilometres. |
|---|---|
| Prussia | 24,332 |
| Bavaria | 5,350 |
| Saxony | 2,325 |
| Würtemberg | 1,475 |
| Baden | 1,414 |
| Alsace | 1,457 |
| Other German States | 4,475 |
| Total Germany | 40,826 |
| Austria-Hungary | 25,731 |
| Great Britain and Ireland | 31,897 |
| France | 35,264 |
| Russia | 29,410 |
| Italy | 12,351 |
| Belgium | 4,828 |
| Holland and Luxemburg | 3,000 |
| Switzerland | 2,974 |
| Spain | 9,669 |
| Portugal | 1,913 |
| Denmark | 1,969 |
| Norway | 1,562 |
| Sweden | 7,527 |
| Servia | 526 |
| Roumania | 2,475 |
| Greece | 670 |
| Turkey | 1,649 |
| Malta | 11 |
| Total Europe | 214,252 |
| *America.* | |
| United States | 251,292 |
| British America | 20,442 |
| Newfoundland | 145 |
| Mexico | 6,723 |
| Central America | 858 |
| Cuba | 1,600 |
| Hayti | 115 |
| Porto Rico | 18 |
| Other West Indies | 474 |
| U. S. Colombia | 342 |
| Venezuela | 400 |
| Ecuador | 204 |
| Peru | 1,347 |
| Bolivia | 130 |
| Chili | 2,900 |
| Argentine Republic | 7,256 |
| Uruguay | 642 |
| Paraguay | 152 |
| Brazil | 8,930 |
| British Guiana | 35 |
| Total America | 304,005 |
| *Asia.* | |
| British India | 23,359 |
| Ceylon | 289 |
| Asia Minor | 658 |
| Trans-Caspian Russia | 1,433 |
| Persia | 18 |
| Dutch East Indies | 1,227 |
| Japan | 1,160 |
| Malay States | 50 |
| China | 138 |
| Cochin China | 83 |
| Total Asia | 28,415 |
| *Africa.* | |
| Egypt | 1,500 |
| Algiers and Tunis | 2,850 |
| Cape Colony | 2,858 |
| Natal | 350 |
| Other districts | 751 |
| Total Africa | 8,309 |
| *Australasia.* | |
| New Zealand | 3,007 |
| Victoria | 3,487 |
| New South Wales | 3,643 |
| South Australia | 2,614 |
| Queensland | 3,107 |
| Tasmania | 526 |
| West Australia | 406 |
| Total Australasia | 16,790 |
| Total for world | 571,771 |

or, in round numbers, 357,400 miles, as above stated.

Besides the table of mileage there are two supplementary tables, one giving the number of locomotives, the other the capitalization. The former is incomplete, and we simply select a few of the leading figures, mostly for 1887:

| | |
|---|---|
| Germany | 12,811 |
| England | 15,552 |
| France | 9,747 |
| Austria | 4,610 |
| Italy | 2,256 |
| Belgium (1886) | 2,332 |
| Russia | 6,591 |
| United States (1888) | 29,398 |
| British India | 3,234 |

The total number of locomotives in Europe is estimated at not quite 61,000, and in other parts of the world not quite 43,000. England has 80 locomotives for every 100 miles of road, and Belgium just about the same number; Germany, 53; France, 47; Russia, 40; Austria, 32; Italy, 30; India, 24, and the United States, 19.

The total railroad capital of the world is estimated at 121,440,000,000 marks, or not quite $29,000,000,000; $15,000,000,000 of this is in Europe, whose railroads are capitalized at $115,000 per mile; $14,000,000,000 in other parts of the world, where the average capitalization is somewhat over $60,000 per mile.

Railroad Commissioner Rich, of Michigan, has issued to the roads of that state an order concerning freight car couplers, the substance of which is, that the authority given in 1886 to use the Aikman, Ames, Blocker, Cowell (freight), Marks, McCree and Perry couplers is rescinded, and the Master Car Builders' type remains the only freight coupler authorized under the laws of 1885 and 1887. The laws referred to provide that after Jan. 1, 1891, no freight car shall be run in the state unless furnished with couplers approved by the Railroad Commissioner. Mr. Rich conferred with the managers of the principal roads before issuing this circular, and they favored the present action. A circular is also issued regarding air brakes and passenger car heaters, which simply reiterates the views embraced in a circular issued Jan. 8 last, which was non-committal. The laws of 1873 and 1875, amended in 1889, require that regular passenger trains shall have air brakes, and after Oct. 1, 1890, all engines and tenders shall have a driver and a tender brake approved by the Railroad Commissioner. Mixed trains shall not be run unless the engine and tender are thus equipped.

The Boston & Albany road, which has been one of the most strenuous objectors to the introduction of the M. C. B. coupler for freight trains, has fallen into line, as appears from the agreement made by the Vanderbilt roads, which has been sent by President Ledyard to Commissioner Rich, and is printed in the circular above referred to. This agreement is as follows:

Resolution in regard to equipment of freight cars with air brakes and self-couplers, passed unanimously at the presidents' meeting, held April 29, 1890.

Present, Messrs. C. Vanderbilt, Depew, Hayden, Webb, Newell, Ledyard, Caldwell, Ingalls, Layng and Bliss.

*Resolved*, That all freight cars hereafter built by the roads in the Vanderbilt System, and by the Boston & Albany, shall be equipped with the air brake; and that all colored line and local box and stock cars of 34 ft. in length and upward, now in service on said roads, shall have the air brake attached as fast as they come into the shop for repairs; and that all such cars so built or repaired shall be also equipped with a self-coupler of what is known as the vertical plane type.

The number of 34-ft. cars already in service is not large, the *Equipment Guide* showing only about 600 on the Boston & Albany and less than 1,000 on the New York Central.

The storms and floods of the first part of last week, which did a good deal of damage to railroads, as well as to other property, in Southern New York and parts of Pennsylvania, were followed by another heavy rainstorm on May 23, which caused washouts and landslides on the Pennsylvania, the Southwest Pennsylvania, the Allegheny Valley, the Baltimore & Ohio and other roads. The Baltimore & Ohio, in the vicinity of Pittsburgh, was damaged more than any of the other lines, by gravel washing upon the track. Travel on the main line of the Pennsylvania was badly impeded for a day. The New York, Chicago & St. Louis lost a wooden bridge 200 ft. long near Crayton, Pa. A freight train ran upon it just after its foundations had been weakened, and 25 cars were wrecked. The engineer was thrown into the water with his engine, but was rescued alive.

On the evening of May 25 a break occurred in the bank of the Erie canal near Whitesboro, N. Y., and the outflowing stream of water, which at the beginning was small, soon increased to 70 ft. in width and rushed with great force over adjoining fields and highways and the New York Central tracks to the Mohawk river. The four main tracks of the railroad were at once undermined, and a westbound freight train was derailed, the engine and 10 cars being overturned, but none of the trainmen were seriously injured. The break is located on what is called the "long level" of the canal, and the serious rush of water did not abate until noon of the next day. New York Central trains had to be run over the West Shore.

The Board of Trade report on the Carlisle (Scotland) accident (written by Col. Rich) has appeared. Col. Rich blames the engine driver for shutting off his small ejector, and concludes that after he had found that he had lost part of his vacuum he became thoroughly confused, and did several things that he should not have done, and omitted to do things that he should have done. At the same time Col. Rich thinks that allowance should be made for the runner, "as it must be a most confusing thing to have both the simple vacuum and the automatic vacuum brake to deal with." It will be remembered that the Coroner's jury exonerated the runner and attributed the accident to the faults of the brake. In this view *The Engineer* and *Engineering* concur. Both of these journals devote much editorial space to discussion of the report, and hold that Col. Rich's conclusions are not warranted by the evidence. The *Engineer* says that "it seems that the driver at one and the same time was able to take the brakes off and yet keep them on, which shows what an ingenious brake this is."

The New York Central has decided to hereafter use broken stone for ballast on the Hudson division, good gravel being scarce on that portion of the line. On the line west of Albany there is an abundance of gravel, and the company has made no change in its policy there. The report printed in a Buffalo paper to the effect that the whole main line was soon to be ballasted with stone, is unfounded. An Albany dispatch states that Michael J. Dady, of Brooklyn, and Louis F. Payn and James W. Husted, of Peekskill, have organized a company for preparing stone ballast and have bought a farm of about 300 acres at Barnegat on the Hudson. The plant to be erected there will cost $100,000 and will be ready for operation within a month.

## THE SCRAP HEAP.

**Notes.**

A wooden freight house of the New York Central, 175 × 350 ft. was burned at Albany on the night of May 21. The building was full of merchandise, which, together with a number of cars, was destroyed.

A new Brooks locomotive lately delivered to the Vanegas Cedral & Rio Verde Railroad (Mexico), had to

be christened by three priests. A general good time with champagne and beer accompanied the ceremony, and an excursion was given over the road.

For the purpose of facilitating the distribution of cars in the coal regions, the Philadelphia & Reading has adopted a new rating by which the capacity of cars can be more readily stated. A "car" will be understood to mean an 8-wheel hopper gondola; two of the old pattern 8-wheeled cars will be regarded as one car, and four of the 4-wheel cars will be regarded as one car.

The yard brakemen of the Illinois Central at Chicago struck on Saturday last and work was suspended for three hours, the difficulty being the alleged unjust suspension of a crew for loafing and hindering an engine an hour or two in reaching the main track from a private siding. The railroad company agreed to immediately investigate the case, and the matter seems to have been compromised, a part of the men being exonerated and a part suspended 10 days.

**Wagner vs. Pullman.**

A suit in equity has been commenced in the United States Circuit Court at Boston by Henry Walter Webb, Trustee for the Wagner Palace Car Co., against the Pullman Palace Car Co. and the New York & New England Railroad, for an injunction to restrain the use by the defendants, on the New York & New England, of Pullman's cars containing improvements in car platforms patented by Phillip Hien, and improvements in combined car buffers and yielding platforms patented by Clinton Browning, both patents being vested by assignment in Webb as Trustee for the Wagner Co., of which he is Vice President.

## LOCOMOTIVE BUILDING.

The Baltimore & Ohio let the contracts on Wednesday of this week for building 23 passenger and freight locomotives.

The Great Falls & Canada has ordered a number of locomotives from the Baldwin Locomotive Works. The firm has nearly completed eight heavy locomotives for the Philadelphia & Sea Shore road similar to those it is building for the Philadelphia & Reading.

The Manchester Locomotive Works are building three engines for the Passumpsic division of the Boston & Maine.

The Savannah & Western has just received two 10-wheel freight locomotives from the Baldwin Locomotive Works, and four for passenger traffic.

The Atlanta & Florida has ordered four new locomotives recently.

The Chicago, Milwaukee & St. Paul has put in service a new engine built at the Milwaukee shops.

## CAR BUILDING.

The Cincinnati, New Orleans & Texas Pacific is asking bids for new box cars.

The Baltimore & Ohio will let contracts this week for building 1,000 box cars, to be equipped with air brakes and M. C. B. couplers, and also for 2,000 coal cars.

The Wells & French Co., of Chicago, has received an order for freight and passenger cars from the Great Falls & Canada road of Montana.

The Pullman Palace Car Co. is building 50 passenger cars for the Philadelphia & Seashore road, to be delivered the last of June.

The Lima Car Works are building 235 tank cars for the Manhattan Oil Co.

The Richmond Cedar Works, Limited, of Richmond, Va.; the Vienna Improvement Co., Vienna, Ga.; A. A. Chapman, Dublin, Tex., and J. M. Battle, of the Citizens' Street Railway Co., Searcy, Ark., will soon order cars for street railroads.

The Roanoke Machine Works have just completed some standard passenger cars for the Norfolk & Western. The passenger car department of the works is to be enlarged.

The United States Rolling Stock Co., of Decatur, Ala., has received an order for 300 box fruit cars for the Georgia Southern & Florida, and 300 box cars for the East Tennessee, Virginia & Georgia. The Alabama Midland has recently received 50 cars from the same company; the Savannah, Americus & Montgomery 50 cars, and the Savannah & Western 30 ore dumping cars.

The Erie Car Works have just received a contract for 1,000 cars, 600 to be box cars and 400 gondolas.

The ground is being surveyed for the proposed car works at Bessemer, Ala., which H. N. De Bardeleben, of Bessemer, proposes to build at that place.

## BRIDGE BUILDING.

**Allentown, Pa.**—It is proposed to erect an iron bridge, 60 ft. long, over the Little Lehigh Creek.

**Baltimore, Md.**—Both branches of the city council of Baltimore, have passed the ordinance appropriating an additional $80,000 for completing the Light street bridge.

**Blocton, Ala.**—The main span of the iron bridge over the Cahaba river, of the Birmingham, Brierfield & Blocton road was completed last week.

**Boston.**—The Board of Aldermen has before it a bill ordering the construction of a foot bridge over the tracks of the Boston & Providence road, from Yarmouth street to Irvington street, similar to the bridge from West Rutland street to Durham street. The cost will be about $6,500. There is some doubt as to whether the city has the power to order the erection of the bridge.

**Camden County, N. J.**—The Board of Freeholders have appropriated a sum for a new bridge over Newton creek on the road from Collingswood to Gloucester City.

**Carondelet, Mo.**—The Skrainka Construction Company, to which was awarded the contract of erecting the bridge across the River des Peres at Broadway, in Carondelet, has refused to accept it, and new bids will be advertised for.

**Cleburne, Tex.**—The Texas Iron Bridge & Cable Co., of Dallas, Tex., has been awarded the contract to build the bridge across the East Buffalo Creek, near the city.

**Cleveland, O.**—Proposals are wanted until June 5, for the construction of the substructure and iron superstructure of a bridge over the Cuyahoga River, at Red Lock. C. E. Perkins, Akron, O., is County Engineer.

**Des Moines, Ia.**—The Des Moines Union Railway Co. will construct a viaduct in Des Moines.

**Douglas County, Neb.**—The County Commissioners will award contracts for building five county bridges at its next session.

**Easton, Pa.**—The superstructure of the bridge of the South Easton & Phillipsburgh is nearing completion, and the spans are being placed in position. The bridge is being erected from Belvidere, N. J., to Easton.

**Elizabeth City, Pa.**—B. L. Wood, Jr., is President, and S. C. Weiskoff is Chief Engineer of the Elizabeth Bridge Co., which proposes to build a bridge over the Monongahela River at this place, this summer.

**Evansville, Ind.**—The County Commissioners will build a new bridge over Pigeon Creek at the Ohio street crossing, the present bridge being in a dangerous condition. The new bridge will be of iron, with a 20-ft. roadway and foot walks on either side.

**Franklin County, O.**—Sealed proposals will be received by the Commissioners of Franklin County, at the County Auditor's office, until June 14, for an iron or steel, or a combination iron and steel deck bridge, to be erected over the Scioto River at Fishinger's Mill, on the line between Norwich and Perry townships. Franklin County, O.; the bridge to consist of three spans of 136 ft. each between pin centres and an 18-ft. roadway.

**Grantsville, W. Va.**—The County Commissioners of Calhoun county have advertised for bids for building a 225 ft. steel bridge with stone piers over the Little Kanawha river at Grantsville. The piers are estimated to contain about 500 cubic yards of masonry each.

**Hamilton County, O.**—Proposals will be received at the office of County Commissioners until June 7 for the construction of a wrought iron bridge on the Cluff road, over Cluff Creek, in Anderson Township, Hamilton County.

**Holyoke, Mass.**—The contract for the Dwight Street Bridge has been awarded to R. F. Hawkins & Co., of Springfield, Mass., for $18,000.

**Indianapolis, Ind.**—The Cleveland, Cincinnati, Chicago & St. Louis has let the contracts for five large bridges to be placed on the Indianapolis and St. Louis divisions, to replace lighter bridges constructed ten or twelve years ago.

**Louisa, Ky.**—A bill has been introduced in the State Legislature to incorporate the Louisa & Cassville Bridge Co.

**Lynchburg, Va.**—The Rivermont Improvement Co. contemplates, it is reported, the erection of a bridge at Lynchburg. R. T. Gleaves is Chief Engineer.

**McKinney, Tex.**—The County Commissioners, of Collin County, will construct an iron bridge over the Trinity River.

**Meridian, Miss.**—The building of a bridge over the railroad tracks at the Union Station is proposed. The Board of Councilmen and Aldermen has appointed a committee to ascertain the cost of constructing such a bridge and what proportion of the cost will be assumed by each of the railroad companies.

**Minneapolis, Minn.**—The project for building the Laurel Avenue bridge over the Great Northern tracks will probably be carried out at once, the necessary amount having been raised.

**Mount Healthy, O.**—Proposals will be received by Arthur S. Hobby, Civil Engineer, 227 Main street, Cincinnati, O., until June 9, 1890, for the construction of a masonry bridge on the Cincinnati & Hamilton pike road, one mile north of Mt. Healthy.

**Philadelphia.**—Property owners have asked councils to authorize the construction of a bridge between Roxborough and Mt. Airy, at a point near Allen's lane, in the Twenty-second Ward, and Leverington avenue, in the Twenty-first Ward.

**Raleigh, W. Va.**—A meeting of the stockholders of the Piney River Bridge Co. will be held at Raleigh C. H., W. Va., on June 7. It is understood that the stock necessary to insure the building of the bridge has been taken, and the meeting is to decide upon the plans for a steel toll bridge. John Beckly is President.

**Reading, Pa.**—Proposals are wanted until June 17, for the construction of several bridges by the Montgomery County Commissioners.

**Salt Lake City.**—The City Council has been petitioned to build bridges over the canal at Sixth street, west.

**Shelburne, Mass.**—Plans and specifications have been completed for an iron bridge to span the Deerfield river, to be erected at a cost of $18,000. Specifications can be seen at the office of Edward W. Shaw, Consulting Engineer, 146 Franklin street, Boston, Mass.

**Shellsburg, Ia.**—Bids are asked by the Commissioners of Benton County for building a bridge across the Cedar river, near Shellsburg.

**Shepherdstown, W. Va.**—A new steel bridge is to be built over the Potomac River at Shepherdstown, to replace a wooden bridge, which was partly washed away last summer.

**Vienna, Md.**—A petition is being circulated in Wicomico County, Md., asking the county commissioners to build a bridge over the Nanticoke River at Vienna. A law empowering the commissioners of Wicomico and Dorchester counties to build the bridge was passed by the late General Assembly.

**Wheeling, W. Va.**—Plans and specifications are being prepared by the city engineer and C. W. Smith for the construction of the bridge at Main street, which it is estimated will cost $92,000.

**Wilbarger County, Tex.**—Bids, with plans and specifications for eight iron bridges, from 100 to 2,000 ft. in length, were received by the commissioners' court of Wilbarger County, May 26.

**Youngstown, O.**—The Youngstown Bridge Co., of Youngstown, has received a contract to build a $35,000 bridge over the Ohio River at Wheeling, W. Va. Among other orders is a bridge for the Baltimore & Ohio, two for the Cincinnati Southern, a city bridge for Baltimore, Md., and one for St. Louis.

## MEETINGS AND ANNOUNCEMENTS.

**Dividends.**

Dividends on the capital stocks of railroad companies have been declared as follows:

*Catawissa*, 3½ per cent. on the preferred stock, payable May 19.

*Chicago & Eastern Illinois*, 1½ per cent. on the preferred stock, payable in June.

*Delaware & Hudson Canal*, quarterly, 1¾ per cent., payable June 16.

**Meetings.**

Meetings of the stockholders of railroad companies will be held as follows:

*Canada Southern*, annual, St. Thomas, Ont., June 4.
*Chicago & Eastern Illinois*, annual, Chicago, Ill. June 4.
*Chicago, Kansas & Nebraska*, annual, Topeka, Kan., June 11.
*Chicago & Northwestern*, annual, Chicago, Ill., June 5.
*Chicago, Rock Island & Pacific*, annual, Chicago, Ill., June 4.
*Chicago, St. Paul, Minneapolis & Omaha*, annual, Hudson, Wis., June 7.
*Dayton, Fort Wayne & Chicago*, annual, Dayton, O., June 3.
*Des Moines & Fort Dodge*, annual, Des Moines, Ia., June 5.
*Fort Worth & Denver Terminal*, special, Board of Trade Building, Fort Worth, Tex., June 9.
*Hudson Suspension Bridge & New England*, annual, New York City, June 2.
*Keokuk & Des Moines*, annual, Des Moines, Iowa, June 4.
*Louisville, New Orleans & Texas*, special, Memphis, Tenn., June 5.
*Missouri Pacific*, special, St. Louis, Mo., July 15.
*Milwaukee, Lake Shore & Western*, annual, Milwaukee, Wis., June 11.
*Nashville, Chatanooga & St. Louis*, special, Nashville, Tenn., June 25.
*Ottawa, Arnprior & Renfrew*, special, Ottawa, Ont., June 10.
*Philadelphia, Newtown & New York*, special, Norristown, Pa., June 10.
*Portland, Saco & Portsmouth*, annual, Kittery, Me., June 2.
*Shamokin, Sunbury & Lewisburg*, special, Philadelphia, Pa., June 25.
*St. Joseph & Grand Island*, annual, Elwood, Kan., June 10.
*St. Louis, Alton & Terre Haute*, annual, St. Louis, Mo., June 2.
*St. Louis & San Francisco*, special, St. Louis, July 21, to vote on the proposition of an increase of the common stock of the company.
*St. Paul & Northern Pacific*, annual, New York City, June 4.
*St. Paul & Sioux City*, annual, St. Paul, Minn., June 7.

**Railroad and Technical Meetings.**

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *Master Car Builders' Association* will hold its next annual convention at Old Point Comfort, Va., June 10. Rooms should be secured of Mr. F. N. Pike, manager, Hygeia Hotel, Fortress Monroe, Va.

The *American Railway Master Mechanics' Association* will hold its next annual convention at Old Point Comfort, Va., beginning June 17.

The *International Association of Car Accountants* will hold its fifteenth annual convention at the Hotel Brunswick, New York City, June 24, 25 and 26.

The *Association of American Railway Accounting Officers* will hold its next annual meeting at the Stockton Hotel, Cape May, N. J., July 9.

The *National Association of General Baggage Agents* will hold its next annual convention at Chicago, Ill., July 16.

The *Traveling Passenger Agents' Association* will hold its next annual convention at Buffalo, N. Y., August 19.

The *New England Roadmasters' Association* will hold its eighth annual meeting at Boston, Mass., Aug. 20 and 21.

The *New England Railroad Club* meets at its rooms in the United States Hotel, Beach street, Boston, on the second Wednesday of each month, except June, July and August.

The *Western Railway Club* holds regular meetings on the third Tuesday in each month, except June, July and August, at its rooms in the Phenix Building, Jackson street, Chicago, at 2 p. m. The Club has adjourned until Tuesday, Sept. 16.

The *New York Railroad Club* meets at its rooms, 113 Liberty street, New York City, at 7:30 p. m., on the third Thursday in each month.

The *Central Railway Club* meets at the Tifft House, Buffalo, the fourth Wednesday of January, March, May, August and October.

The *Northwest Railroad Club* meets on the first Saturday of each month in the St. Paul Union Station at 7:30 p. m.

The *Northwestern Track and Bridge Association* meets on the Saturday following the second Wednesday of each month at 7:30 p. m. in the director's room of the St. Paul Union station, except in the months of July and August.

The *American Society of Civil Engineers* holds its regular meeting on the first and third Wednesday in each month, at the House of the Society, 127 East Twenty-third street, New York.

The *Boston Society of Civil Engineers* holds its regular meetings at Boston, at 7:30 p. m., on the third Wednesday in each month. The next meeting will be held at the American House.

The *Western Society of Engineers* holds its regular meetings at its hall, No. 67 Washington street, Chicago, at 7:30 p. m., on the first Tuesday in each month.

The *Engineers' Club of St. Louis* holds regular meetings in the club's room, Laclede Building, corner Fourth and Olive streets, St. Louis, on the first and third Wednesdays in each month.

The *Engineers' Club of Philadelphia* holds regular meetings at the house of the Club, 1,122 Girard street, Philadelphia.

The *Engineers' Society of Western Pennsylvania* holds regular meetings on the third Tuesday in each month, at 7:30 p. m., at its rooms in the Penn Building, Pittsburgh, Pa.

The *Engineers' Club of Cincinnati* holds its regular meetings at 8 p. m. on the third Thursday of each month at the Club rooms, No. 24 West Fourth street, Cincinnati.

The *Civil Engineers' Club of Cleveland* holds regular meetings on the second Tuesday of each month, at 8:00 p. m., in the Case Library Building, Cleveland. Semi-monthly meetings are held on the Fourth Tuesday of the month.

The *Engineers' Club of Kansas City* meets in Room 200, Baird Building, Kansas City, Mo., on the second Monday in each month.

The *Engineering Association of the Southwest* holds regular meetings on the second Thursday evening of each month at 8 o'clock, at the Association headquarters, Nos. 63 and 64 Baxter Court, Nashville, Tenn.

The *Civil Engineers' Society of St. Paul* meets at St. Paul, Minn., on the first Monday in each month.

The *Montana Society of Civil Engineers* meets at Hel-

ena, Mont., at 7:30 p. m., on the third Saturday in each month.

The *Civil Engineers' Club of Kansas* holds regular meetings on the first Wednesday in each month at Wichita, Kan.

**American Society of Mechanical Engineers.**

On May 8 there passed into the possession of Trustees the title deeds for the house and lot at No. 12 West Thirty-first street, in this city., which will be hereafter the permanent home of the library and offices of this society.

Notice is hereby given to all the members of the Society and allied organizations of this change of address, and all communications should hereafter be sent to the Society's house as above.

The library will be on the second floor. This second floor has been fitted up by its former owners as a library area, and has a capacity for 20,000 volumes. As the present library of the Society numbers less than 2,000 volumes, it will be seen that there is room for abundant growth. The third story rear room will be used as a room for photographs, drawings and collections of models and apparatus, and in this room with a sunny southern exposure will be kept a drawing table and usual instruments for the use of non-resident members who may find such an outfit a convenience when in the city. The incandescent electric light is to be put into the building throughout, which will add very much to the comfort of every one, particularly of readers at night and in warm weather.

On the ground floor is the large auditorium, two stories in height, with seating capacity for over two hundred, electrically lighted, and ventilated by mechanical means.

The house is 28 ft. 4 in. wide, and is 175 ft. west of Fifth avenue. The house and lot cost $60,000. Of this sum $33,000 is left on bond and mortgage by its former owners, and the balance was subscribed for and loaned by interested members of this Society. Considerably more has been subscribed than is actually needed, although not enough to clear off the mortgage entire. The Council congratulates the members on the fact that at so early a period in its history the Society should have been able to undertake successfully so signal a step of progress and prosperity as to be able to arrange for permanent quarters in so eligible a location and in a house so admirably adapted for present and future needs. F. R. Hutton, Secretary.

**Car Accountants' Association.**

The committee on order of business has issued a program for the 15th annual meeting, to be held at the Hotel Brunswick, New York City, June 24, 25 and 26 next. Reports of committees, among which are those on Per Diem, on Cipher Code, on Demurrage and Car Service, are to be presented Tuesday morning. A paper by A. Hale, on Errors in Reports received by the Car Record Office, is to be read on that day. On Wednesday there is a paper by M. C. Trout on Straight Per Diem, and one by A. D. Penfold, on Detention of Foreign Cars. On Thursday there is a paper by W. G. Wattson on the Cause of the Constantly Decreasing Mileage of Freight Cars on Home Lines, and one by Edmund Yardley on Economic Working of Car Record Departments. It is expected that other important papers will be presented, and members are requested to come prepared to sharply question the speakers.

The Lehigh Valley will run a special train for members and their families from Buffalo, leaving at 8 a. m. June 23. No passes are required on this train. The session each day will be from 9.30 a. m. to 2 p. m., and there will be excursions to West Point and to Long Branch, going by boat and returning by railroad in each case.

**Engineers' Club of St. Louis.**

The 329th meeting was held May 21, 1890, nineteen members and three visitors present.

Prof. Johnson announced that the purse to be presented to the son of the late Prof. Smith—for many years secretary of this club—had reached nearly $270.

The paper of the evening, by George A. Brown, entitled "The Function of the Government in a Plan for General Irrigation" was then read by Prof. Johnson. The paper discussed at some length the necessity of providing some more complete and systematic method of dealing with the problem of the artificial distribution of water for purposes of irrigation, this problem being one of great importance, especially in the Western States and Territories. The author claimed that the arid region was nearly as great in extent as the remaining portion of the country, and the land was of but little value without water rights. The government is now asked to determine the amount of water available for the purpose and to provide laws regarding its distribution and apportionment. He thought the government should give a title to certain water privileges, the same as it gives to land.

In the discussion, Prof Nipher said that experiments extending over a long period of years had demonstrated that the apparent increase in rainfall in forests was due to the fact that the rain caught in the gauges was not affected by wind currents. Improved forms of rain-gauges had shown that there was no actual difference between the amount of rain falling in forests and in open places.

Mr. Robert Moore stated that such investigations as he had been able to make had satisfied him that the popular opinion that forests increased the amount of rain fall was a fallacy, and he was glad to see the matter set at rest authoritatively.

**Exhibits at the M. C. B. Association.**

If manufacturers and others who contemplate having articles on exhibition before the Master Car Builders' Association at Old Point Comfort, Va., will have them addressed to themselves, in care of Mr. F. N. Pike, Manager Hygeia Hotel, he will attend to receiving them and having them brought up from the steamers and trains, for which service a reasonable charge will be made. Jno. W. Cloud, Secretary.

**Master Mechanics' Association.**

Secretary Sinclair announces that members of the Master Car Builders' and Master Mechanics' associations who travel over the Chesapeake & Ohio in going to or returning from the conventions at Old Point Comfort may obtain passes from Mr. Wm. Garstang, Superintendent of Motive Power, Richmond, Va. Members will be interested to learn that President Ingalls, of the Chesapeake & Ohio, will deliver the address of welcome at the opening of the Master Mechanics' Convention.

**Order of Railway Conductors.**

The annual meeting at Rochester, N. Y., adjourned on Saturday last after electing officers as follows: E. E. Clark, Ogden, Utah, Grand Chief Conductor; J. D. Shultz, Rochester, Grand Junior Conductor; R. E. Fitzgerald, St. Louis, member of the executive committee; Samuel Philips, Phillipsburgh, N. J., member of the insurance committee. A large majority of the delegates accepted the invitation of the Rome, Watertown & Ogdensburg on Sunday, and took a ride to the lake. The next convention will be held in St. Louis. The action of the meeting on the strike question is reported as follows: While individual action of members of this order is now in no way restricted, this organization is not on a strike basis, nor has any legislation in that direction been proposed.

**Railway Telegraph Superintendents.**

The ninth annual meeting of the Association of Railway Telegraph Superintendents will be held at the Cataract House, Niagara Falls, N. Y., on Wednesday, June 18. The announcement says that the support given to the Association by leading railroads, and the success with which it has been attended since its formation (Nov. 20, 1882), in elevating the standard of employés and eliminating those of objectionable records from the service, have been very gratifying, and that the coming meeting is expected to be one of the most important yet held. Papers are to be read on various topics, signals, electric devices, etc. It is desired that as many railroads as possible be represented. Any officer in charge of operators is eligible on the payment of $3 membership fee, which includes all dues for the year. The officers of the Association are: C. A. Darlton (Richmond & Danville), President, Washington, D. C.; G. T. Williams (New York, Chicago & St. Louis), Vice-President, Cleveland, O.; P. W. Drew, Secretary, 535 Sixty-seventh street, Englewood, Ill.

## PERSONAL.

—Mr. W. C. Cooley, Master Mechanic of the Pacific Division of the Northern Pacific, died May 17.

—Mr. G. C. Thayer, Superintendent of the Central New England & Western, has resigned that position.

—Mr. Church Howe has resigned his position as Vice-President of the Pacific of Nebraska, a part of the Missouri Pacific system.

—Mr. E. F. C. Davis, Superintendent of the Philadelphia & Reading Coal & Iron Co.'s shops at Pottsville, has resigned to become General Manager of the Richmond Locomotive & Machine Works, at Richmond, Va.

—Mr. John M. Sanborn, late Master Mechanic of the Lake Shore & Michigan Southern, and formerly Master Mechanic of the Cincinnati, Sandusky & Cleveland, died suddenly at his home in Norwalk, O., recently.

—Mr. J. F. Goddard, who has resigned as Third Vice-President of the Atchison, Topeka & Santa Fe, has, it is stated, been offered the chairmanship of the Trunk Line Passenger Association, which has been vacant since the resignation of Mr. Lucius Tuttle.

—Mr. Charles Hamilton, Superintendent of the St. Louis division of the Mobile & Ohio for the last four years, and for eight years prior President and General Manager of the St. Louis & Cairo road, which was absorbed by the Mobile & Ohio, has resigned his position.

—E. P. Davis, formerly an employé of the Inspection Bureau of the Central Traffic Association, at Chicago, has been appointed Special Agent of the Interstate Commerce Commission. The Chicago papers say he is to be assigned the duty of discovering and reporting violations of law.

—Mr. R. H. Gilmour, Master Mechanic of the Northern Pacific & Manitoba, died at Winnipeg last week. Mr. Gilmour was formerly Master Mechanic of the Manitoba & Northwestern and of the Canadian Pacific, and had also been connected with the mechanical department of several roads in the United States.

—Mr. Godfrey W. Rhodes, Superintendent of Motive Power of the Chicago, Burlington & Quincy, has fractured one arm and dislocated a bone in the other by a fall from a bicycle. Our informant states that he is laid up for three or four days. One would naturally suppose that he would be, although, perhaps, a railroad man has no business to be laid up for such a trifle.

—Mr. John S Cook, who was General Freight and Passenger Agent of the Peoria, Pekin & Jacksonville, now the Jacksonville & Southeastern road, from 1858 to 1876, and since then General Manager of the old Pekin, Lincoln & Decatur, and later General Western Agent at Kansas City of the Chicago, Rock Island & Pacific, died last week at Jacksonville, Ill. He retired from railroad service several years ago on account of ill health.

—Mr. A. Twohey, Superintendent of the Upper Coos and Hereford roads, was killed last week by the falling of a trestle bridge under the weight of a special engine, which was proceeding to a landslide on the Upper Coos road, about 20 miles from North Stratford, N. H. Mr. Twohey had been Superintendent of these roads since their construction, and was formerly connected with the Grand Trunk for a number of years.

—Mr. T. Haskins Du Puy, a well-known civil engineer, died at Orange, N. J., May 15, aged 69 years. His first service was with the Delaware & Hudson Canal Co. A year after entering its employ he entered the service of the Pennsylvania, and was one of the first to build iron bridges in this country. After this he was successively President of the Catawissa road, President of the Chicago & Fort Wayne, Vice-President of the Mobile & Ohio, and Assistant to President Hugh Jewett in the construction of the Chicago & Atlantic.

—Mr. James R. Maxwell is to sail by a Pacific Mail Steamer on the 31st for South America, where he will be Chief Engineer of the Oroya Railroad. Mr. Maxwell was one of the locating and constructing engineers on the Union Pacific from shortly after its commencement until its completion. Later he spent some years in South America on the Meigs railroads. Since his return from South America he has been employed mostly in the Rocky Mountain regions, locating and constructing railroads, and has solved some very difficult problems with acknowledged success. He now returns to South America on the invitation of Mr. Thorndike, who has secured some valuable concessions.

—Mr. Frank L. Sheppard, Superintendent of Motive Power of the Pennsylvania Division of the Pennsylvania, has been appointed General Superintendent of the division, to succeed Mr. Robert E. Pettit, resigned. Mr. Sheppard entered the service of the company as an apprentice in the Altoona shops in 1868, and has been since continuously in its service in different capacities. From 1881 to 1882 he acted as Superintendent of the Sunbury Division of the Philadelphia & Erie Division, and since 1882 has been Superintendent of Motive Power of the Pennsylvania Railroad Division. Mr. J. M. Wallis, who succeeds him in the latter office, is a graduate of the Stevens Institute of Technology. He entered the service of the company in 1877 as an apprentice in the machine shops of the Northern Central at Baltimore. In 1879 he was transferred to Altoona.

—Gen. Edward F. Winslow, who has been President of the St. Louis & San Francisco for the last ten years, will soon resign that position, and will be succeeded by Mr. Allen Manvel, of the Atchison, Topeka & Santa Fe. Mr. Winslow has been in railroad service since 1860, and has been interested as a contractor in the construction of the St. Louis, Vandalia & Terre Haute, Cairo & Vincennes and West Shore roads. He was President of the North River Construction Co., which was the principal contractor for the West Shore. He has also been Receiver, and Vice-President and General Manager of the Burlington Cedar Rapids & Minnesota, now the Burlington, Cedar Rapids & Northern; Vice-President of the Atlantic & Pacific; Vice President and General Manager of the Manhattan Elevated roads in New York City, and also President of the New York, Ontario & Western. General Winslow intends to sail for Europe early in June, and will remain abroad several months.

## ELECTIONS AND APPOINTMENTS.

*Albany, Boston & Florida.*—The following officers have been elected: President, M. R. Mallette; Vice President, J. W. Taylor; Treasurer, D. R. Blood; Secretary. W. M. Brooks, all of Boston, Ga.

*Atchison, Topeka & Santa Fe.*—John Player, Superintendent of Motive Power of the Wisconsin Central for the last three years, has been appointed Superintendent of Machinery of this road, to succeed Harvey Middleton, who has accepted a position with the Union Pacific and who was appointed to the position last July.

Col. A. S. Johnson, Land and Tax Commissioner, having resigned, John E. Frost will succeed him as Land Commissioner and E. T. Cartlidge as Tax Commissioner, both with office in Topeka, Kan.

*Atlantic & Danville.*—E. T. Smith, Division Superintendent of the Georgia Pacific, has been appointed General Superintendent, with office at Portsmouth, Va.

*Atlantic & Pacific.*—At the annual meeting in New York, May 27, the following were elected directors: George C. Magoun, J. J. McCook, B. P. Cheney, J. A. Williamson, Alden Spear, Levi C. Wade, Allen Manvel, Thomas Baring, Cecil Baring, William Libbey, E. H. Abbot, Samuel Hays and J. D. Springer. The following have retired from the board: Walter L. Frost, Jesse Seligman, Edward H. Pardee, John B. Kerr, Bryce Gray and William F. Buckley.

*Buffalo, Thousand Islands & Portland.*—The officers of this road are: President, Charles Parsons, Jr., 96 Broadway, New York City; Secretary and Treasurer, J. A. Lawyn, and Chief Engineer, F. R. Becker.

*Burlington, Cedar Rapids & Northern.*—At the annual meeting of the stockholders of the road in Cedar Rapids, Ia., May 28, the following Board of Directors was chosen for a term of three years: R. R. Cable, E. S. Bailey, C. P. Squires, Lyman Cook and F. H. Griggs. George W. Cable was elected to fill the vacancy created by the death of C. D. Close, and W. H. Truesdale was elected to fill that occasioned by the death of J. N. Dewey. The following officers were elected: President, C. J. Ives; Vice-President, Robert Williams; Treasurer, H. H. Hollister; Secretary and Assistant Treasurer, S. S. Dorwart.

*Chicago & Atlantic.*—G. G. Cochran has been appointed General Freight Agent of the road to take effect June 1, vice A. S. Crane, resigned. Mr. Cochran is the Western agent of the New York, Lake Erie & Western.

*Chicago, Burlington & Quincy.*—A circular has been issued announcing that George B. Harris has been elected Second Vice-President of this company in place of Henry D. Stone, resigned. For the present and until further orders Mr. Harris will also act as General Manager of the lines in Illinois and Iowa, in place of E. P. Ripley, resigned.

The annual meeting was held in Chicago, May 21. There were 516,000 shares of stock represented out of a total of 768,000 shares. The old Board of Directors was re-elected, except that E. W. Hooper, of Cambridge, Mass., was elected in place of Wirt Dexter, who died a few days ago.

*Chicago & Eastern Illinois.*—J. R. Lawrence, foreman of the Columbus, Hocking Valley & Toledo car shops, has been appointed Master Car Builder of this road, with headquarters at Danville, Ill.

*Chicago & West Michigan.*—S. T. McKinnan has been appointed Auditor of the road, with headquarters at Grand Rapids, Mich.

*Clarksdale & Northeastern.*—The following directors have been elected by this Mississippi company: John Clark, J. A. Cooper, J. W. Cutrer, R. C. Bobo, J. L. Simmons, R. H. Wildberger, L. Marks, Walter Clark, R. H. Harris, G. A. Wilson, W. D. Cutrer, Nicholas Gwynn, of New York; A. H. Jamison, F. M. Hamblet, C. W. Partee and J. A. Campbell and N. Gwynn, of New York. The following officers have been chosen: R. H. Wildberger, President; John Clark, Vice-President; R. N. Harris, Secretary; J. L. Simmons, Treasurer; R. E. Bobo, General Manager; Cutrer & Cutrer, Attorneys.

*Cleveland, Chapin Falls & Northern.*—The directors of the reorganized company are: J. W. Wardwell, C. H. Blood, H. A. Kennedy, E. T. Blood, William Hutchins, George March, A. B. Gardner, Washington Gates, Alfred Adams and I. W. Pope. The directors have elected J. W. Wardwell President and C. H. Blood Secretary.

*Cleveland, Lorain & Wheeling.*—At the annual meeting recently held at Cleveland, O., the directors were re-elected as follows: Selah Chamberlain, Worthy S. Streator, E. R. Perkins, Oscar Townsend, C. L. Cutter, John Newell and H. A. Kent. The board re-elected the officers as follows: President, Selah Chamberlain; Vice-President, Worthy S. Streator; General Manager, Oscar Towsend; Secretary and Treasurer, C. L. Cutter; Auditor, W. H. Park; Counsel, J. W. Tyler; Superintendent, Frank M. Townsend.

*Columbus, Hocking Valley & Toledo.*—W. H. Fisher, recently General Agent of the Cincinnati, Hamilton & Dayton at Indianapolis, and now General Passenger and Ticket Agent of the Fort Wayne, Cincinnati &

Louisville, has been appointed General Passenger and Ticket Agent of this road, with office at Columbus, O., to succeed H. J. Falkenbach, resigned.

*Concord.*—At the annual meeting of the corporation in Concord, N. H., May 27, the following directors were elected: Frederick Smyth and William Parker, of Manchester; B. A. Kimball, John H. Pearson and John A. White, of Concord; C. E. Tilton and A. J. Pillsbury, of Tilton.

*Delaware & Chesapeake.*—At the annual meeting of the road recently held at Easton, Pa., the following officers and directors were elected: President, George B. Roberts; Secretary, Robert H. Groff; Treasurer, Robt. W. Smith. Jas. B. Groome, Samuel Wetherell, Sr., David B. Cummins, Henry D. Welsh, J. N. Du Barry, John P. Green, George V. Massey and D. S. Newhall.

*Denver & Rio Grande.*—The annual meeting of the stockholders was held at Denver, May 27, at which 80 per cent. of the stock was represented. The old Board of Directors was re-elected. They will meet in New York June 5 for the purpose of electing officers.

*Des Moines & Northern.*—R. C. Martin has been appointed Commercial Agent to succeed George D. McCain. The office of General Freight Agent has been abolished. Correspondence relative to the freight department should be sent to General Manager L. M. Martin at Des Moines.

*Dutchess County.*—The officers of this company are President, James W. Husted; General Manager, J. C. Stanton; Chief Engineer, S. G. Primrose; Secretary and Treasurer, D. J. McNiece. The office of the company is at 35 Broadway, New York City.

*Duluth & Winnipeg.*—Orlando Rowley has been appointed Traffic Manager of the road, and Joseph Pottigieser has been appointed Emigration and Ticket Agent of the same line, with offices at St. Paul. Mr. Rowley is at present local agent in St. Paul for the Chicago, St. Paul & Kansas City.

*Easton & Philadelphia.*—The following is the first Board of Directors: C. R. Williams, of Philadelphia, President. John H. Dingle, Paoli; Edward D. Cook and Thomas S Stout, Philadelphia; Christian E. Metzler, Germantown; Thomas Briggs, Newtown, and Wilson S. Paxson, Lumberville.

*Elwood Short Line.*—The officers of the road are: H. W. Hartman, President; L. H. Williams, Treasurer, and Paul Didier, Chief Engineer. The office is at 108 Fourth avenue, Pittsburgh.

*Flint & Père Marquette.*—At the annual meeting of stockholders held in East Saginaw, Mich., May 22, 70,863 of a total of 96,402 shares were represented. The election of directors resulted in the choice of W. W. Crapo and Loum Snow, of New Bedford, Mass.; J. W. McIntosh, F. V. Parker and J. Lewis Stackpole, of Boston; Lewis Pierce, of Portland, Me.; George Coppell, of New York; H. C. Potter, W. L. Webber, H. C. Potter, Jr., of Saginaw; and W. H. Tousey, of Bay City. The directors re-elected officers as follows: President, W. W. Crapo; Vice-President, H. C. Potter; Secretary and Treasurer, H. C. Potter, Jr.

*Fort Worth & Denver City.*—O. O. Winter, of Fort Worth, has been promoted to the position of Superintendent of the line, to succeed R. J. Duncan, resigned.

*Georgia Pacific.*—The road will hereafter be operated in three districts, as follows: First District, Atlanta to Birmingham, with C. P. Hammond as Superintendent, and with office in Birmingham; Second District, Birmingham to Columbus, including all branches, with J. H. Garner as Superintendent, vice E. T. Smith, resigned, with office at Birmingham; Third District, Columbus to Greenville, including all branches, with S. H Purcell, Superintendent, with office at Greenville, Miss. Mr. Hammond has been Engineer of Maintenance of Way of the Richmond & Danville at Atlanta. Mr. Garner has been Superintendent of the First Division.

*Great Northern.*—W. F. Herman has been appointed General Agent of the freight and passenger department of the road, with office at Cleveland, Ohio.

*Green Mountain.*—M. H. Wardwell, of Bangor, Me., has been elected General Manager of the road.

*Gunpowder Valley.*—The stockholders at a recent meeting in Carroll County, Md., elected the following directors: George M. Fultz, W. E. Hoffman, J. D. Shearer, C. Zeigler, G. W. S. Hoffman, J. A. Frederick and J. W. Hoffman. The following officers were also elected: G. W. S. Hoffman, President; Charles Zeigler, Vice-President; J. W. Hoffman, Treasurer, and J. B. Brown, Secretary.

*Harriman Belt.*—The officers of this company are: Gen. Clinton B. Fisk, President, Times Building, New York City; W. C. Harriman, Vice-President; Frederick Gates, Secretary and Treasurer; W. H. Russell, General Manager, and J. P. Suverkrop, Acting Engineer, all of Harriman, Tenn.

*Homer & Susquehanna.*—The incorporators of this Pennsylvania road are: J. W. Guthrie, Indiana, Pa., President; John W. Sutton, S. W. Guthrie, Harry W. Wilson, John P. Elkins and Thomas F. Lee, all of Indiana, and B. F. Ritts, of Cherry Tree, Pa.

*Hot Springs, Spring Creek & Savannah.*—At a meeting of the stockholders of the road Col. W. L. Albright, of Chattanooga, Tenn., was elected President, and Beverly W. Hill, of Hot Springs, N. C., Vice-President.

*Kansas City & Belt.*—The following directors were elected at the recent annual meeting: George H. Nettleton, Wallace Pratt, Sr., W. J. Ferry, J. D. Springer, A. A. Robinson, E. Wilder and A. J. Earling.

*Kansas City, Wyandotte & Northwestern.*—C. A. Shanks has been appointed General Freight and Passenger Agent of the road to succeed C. W. Cook, who has resigned to become General Freight Agent of the Indiana, Illinois & Iowa. Mr. Shanks has been General Agent at Beatrice, Neb.

*Lake Shore & Michigan Southern.*—The Sturgis, Goshen & St. Louis road will be operated as a branch of the Michigan division, to be known as the Goshen & Michigan branch. W. I. Fox has been appointed Assistant Superintendent of the branch, with office at Sturgis, Mich., under the direction of the Superintendent of the Michigan division.

*Louisville & Nashville.*—F. C. Shepard has been appointed General Agent of the road at New Orleans in place of D. C. Roberts, deceased.

*Louisville, New Orleans & Texas.*—W. F. Meath having been assigned to other duties, A. A. Sharp has been appointed Superintendent of the Memphis and Riverside Divisions. A. W. Robinson has been appointed Assistant Superintendent of the Riverside Division with headquarters at Greenville, Miss.

*Merchants' Bridge Co.*—The annual meeting of the company was held at Venice, Ill., May 13, and the following directors elected: S. W. Cobb, Charles Clark, D. R. Francis, L. C. Nelson, C. C Rainwater, B. F. Hobart, George H. Goddard, John R. Holmes and A. B Ewing. The following officers were elected: President, S. W. Cobb; Vice-President, A. B. Ewing; Secretary, George H. Goddard. The latter succeeds John H. Overall as Secretary, and A. B. Ewing succeeds John R. Holmes as Vice-President.

*Metropolitan Southern.*—The following are the incorporators of this Maryland road: Henry T. Douglas, Eben J. D. Cross, Edward J. Silkman, Herbert R. Preston and Stephen P. Kretzer, of Baltimore.

*Mexican National.*—J. Kerr has been appointed Master Mechanic of the road, succeeding W. I. McCammon. His headquarters will be at the City of Mexico.

*Missouri, Kansas & Texas.*—The annual meeting of the company was held in Kansas City, May 21, and resulted in the election of the following directors: H. K. Enos, Joel T. Freeman, Colgate Hoyt, William Dowd, Simon Sterne, J. J. DeNeuville, Samuel Sloan, Henry W. Poor, Maynard C. Eyer, all of New York; H. J. Demauer Oyens, of Amsterdam, Holland; H. C. Cross, of Emporia, Kan.; B. P. McDonald, of Fort Scott; Lee Clark, of Parsons; J. C. Thompson, of Sedalia, Mo., and J. Waldo, of Houston, Tex. The Board of Directors have elected H. K. Enos, of New York, President of the company.

A. T. Drew has been appointed Freight Claim Agent of the road, vice J. H. Redmon, resigned, the appointment to take effect June 1. The freight claim department has been placed under the supervision of the Traffic Manager.

*Monongahela & Chartiers.*—The incorporators of this Pennsylvania company are: Henry Large, Jr., West Elizabeth, President; R. M. Blackburn, Blair's Station; John Sperber, Glenfield; W. W. Payne, Coal Valley; William H. Stevenson, R. Q. Witters, F. C. Renziehausen and Charles Lodge, Pittsburgh.

*Neville Island.*—The incorporators of this recently chartered Pennsylvania company are: David Smith, Tarentum, Pa., President; George P. Christy, J. O. H. Moore, Jno. W. Hague, Thos. N. Christy, F. S. Christy, all of Allegheny, Pa., and F. W. Smith, of Pittsburgh.

*Northern Pacific.*—L. M. Jenney has been appointed Road Master, with jurisdiction over the Pacific division and the Cascade Western division and branches, vice Edward Reardon, resigned.

*Orange Belt.*—William Macleod, Treasurer, has been appointed General Manager. George A. Hill has been appointed Treasurer, Hugh H. Richardson, Secretary, and Charles Davis, Assistant General Freight and Passenger Agent. J. W. Taylor has been appointed General Freight and Passenger Agent in addition to his duties as Auditor. The general office is at Oakland, Fla.

*Pennsylvania.*—The following appointments upon the Pennsylvania Railroad Division have been announced: F. L. Sheppard, General Superintendent, with office at Altoona, vice Robert E. Pettit, resigned; J. M. Wallis, Superintendent of Motive Power, with office at Altoona, vice F. L. Sheppard, promoted; C. A. Chipley, Assistant General Freight Agent, vice John Whittaker, deceased, and Samuel L. Seymour, Division Freight Agent west of Harrisburg, with office at Pittsburgh, vice C. A. Chipley, promoted. F. M. Bushong, at present ticket Agent at Steubenville, O., has been appointed Traveling Passenger Agent of the company, with headquarters at Detroit, vice D. L. Smith, transferred to Columbus to succeed C. F. Crawson.

*Pittsburgh, Youngstown & Ashtabula.*—At the stockholders' meeting at Youngstown Pa., May 15, directors were elected as follows: John N. Hutchinson, G. B. Roberts, J. N. McCullough, Thomas D. Messler, William Mullins, C. B. Wick, W. S. Bonnell, H. L. Morrison, Amos C. Field and William Thaw, Jr. The following officers were elected: John N. Hutchinson, Philadelphia, President; John E. Davidson, Pittsburgh, Treasurer; S. B. Liggett, Pittsburgh, Secretary.

*Pullman's Palace Car Co.*—J. N. Mileham, formerly Master Car Builder of the New York, Lake Erie & Western, has been made Assistant Superintendent of the shops at Wilmington, Del.

*Quincy, Omaha & Kansas City.*—The annual meeting was held at Quincy, Ill., May 21. Gen. James A. Morgan and H. F. J. Ricker were elected directors to succeed W. S. Warfield and W. L. Distin. The directors elected the following officers: President, C. H. Bull; First Vice-President, Amos Green; Secretary, Charles H. Spencer, and Treasurer, E. J. Parker.

*Rhinelander & Western.*—The directors of this Wisconsin road are: E. S. Shepard, Chas. Chafee, G. S. Coon, John Barnes and E. O. Brown. The officers are: Giles S. Coon, President; E. S. Shepard, Chief Engineer; John Barnes, Solicitor; E. O. Brown, Secretary and Treasurer, all of Rhinelander, Wis.

*Richmond & Danville.*—The offices of the Superintendent and the Engineer Maintenance of Way of the North Carolina Division have been removed from Durham to Raleigh, N. C.

*Rio Grande Western.*—W. H. Snedaker has been appointed General Agent, passenger department, with office in San Francisco, Cal.

*St. Louis & San Francisco.*—The following directors of the Atchison, Topeka & Santa Fé were this week elected directors of this company: Thomas Baring, George C. Magoun, John J. McCook, William Libbey, Allen Manvel, Cecil Baring and Alden Speare. They succeed Jesse Seligman, Henry Seligman, Horace Porter, George Coppell, Bryce Gray, Henry K. McHarg and Henry L. Morrill. Henry L. Morrill resigned as Vice-President and General Manager, and was elected Second Vice-President and General Manager, and J. W. Reinhart was elected First Vice-President.

*Southern California.*—At the recent annual meeting of the road the following Board of Directors was elected: George C. Magoun, New York; Allen Manvel, Chicago; John J. McCook, New York; Benjamin Kimball, Boston; Bryant Howard. A. K. Lawrie, San Diego; J. N. Victor, H. L. Drew, San Bernardino; H. W. Hellman, George H. Bonebrake, Richard Egan, Los Angeles. The only change was the substitution of H. W. Hellman for I. W. Hellman. The following officers were elected: President, George C. Magoun; First Vice-President, A. Manvel; Second Vice President and General Auditor, J. W. Reinhart, Boston; Treasurer, Assistant Secretary and Tax Commissioner, Frank H. Pattee, Los Angeles; Secretary, C. S. Tuckerman, Boston; General Manager, K. H. Wade, Los Angeles; Chief Engineer, Fred T. Perris, San Bernardino.

*Southern Pacific.*—The Auditing Department of the South Pacific Coast and Southern Pacific will be incorporated under the general system in charge of the general auditor of the Southern Pacific. C. J. Robinson, formerly Auditor, will be retained in some other capacity.

*South Sioux Falls.*—The officers of this company are: R. F. Pettigrew, President; S. L. Tate, Vice-President and Treasurer; C. G. Ferguson, Secretary, and J. C. Barton, Chief Engineer, all of Sioux Falls, S. D.

*Staten Island Rapid Transit.*—The Accounting Department of this company will hereafter be in charge of an Auditor, to whom all traffic reports and communications pertaining to revenue accounts should be sent. H. C. Willets, formerly Accountant, has been appointed Auditor, with office at the foot of Whitehall street, New York City.

*Thomasville, Silver Valley & Pee Dee.*—The following directors were elected at a meeting of stockholders at Thomasville, N. C.: John T. Cramer, President; Joseph H. Lambeth, Secretary; D. T. Lambeth, L. V. Mauney, J. M. Badgett, T. C. Thomas and George Kinney.

*Tipton.*—The annual election of directors resulted as follows: President, J. N. Du Barry; John P. Green, N. P. Shortridge, Henry D. Welsh, G. B. Roberts, W. L. Elkins and Amos R. Little.

*Turtle Creek Valley.*—The following directors were elected at the annual meeting held at Philadelphia, Pa.: J. N. DuBarry, President; Robert Pitcairn, Henry D. Welsh, John P. Green, W. H. Barnes, N. P. Shortridge and W. A. Patton.

*Union Pacific.*—A circular has been issued announcing that all the lines comprising the Union Pacific, Denver & Gulf, and the Denver, Leadville & Gunnison will hereafter be operated as one general division, to be known as the Gulf division. C. F. Meek has been appointed General Manager of the Gulf division, reporting direct to the vice-president. The following officers, whose authority has been extended over the Gulf division, will report direct to the Vice-President: General Solicitor, General Traffic Manager, Chief of Construction Department, Chief Engineer, General Land Commissioner, Superintendent of Motive Power and Machinery, Superintendent of Car Service, Superintendent of Telegraph, General Purchasing Agent and Chemist of the company.

The lines from Cheyenne to Wendover, as well as the Denver, Texas & Fort Worth road, from Denver to Texline, will be hereafter known as the New Mexico division, with F. E. Bissell as Superintendent.

The following officers, with headquarters at Denver, Col., have been placed in charge of the traffic of the Gulf Division of the system, reporting to the General Traffic Manager: H. A. Johnson, General Freight Agent; George Ady, General Passenger Agent; George Wild, Jr., Assistant General Freight Agent; F. B. Semple, Assistant General Passenger Agent; J. C. Leary, General Live Stock Agent. The jurisdiction of W. H. Hancock, Freight Claim Agent, Omaha, and A. Traynor, General Baggage Agent, Council Bluffs, is extended over the Gulf Division.

Harvey Middleton, Superintendent of Machinery of the Atchison, Topeka & Santa Fe, has been appointed to a similar position on this road, to succeed George Cushing, who has held the position since January, 1889.

*Wabash.*—The following changes have been made: The territory of J. D. McBeath, New England Passenger Agent, has been extended to include the lines of the New York Central Hudson River and West Shore roads and territory east and north of those lines; the territory of L. S. McClellan, South Eastern Passenger Agent, has been extended to include territory south and west of the West Shore road in New York state, including Buffalo; E. T. Monett, New York State Agent, has been appointed Eastern Passenger Agent, vice James R. Dunbar, resigned.

*Western New York & Pennsylvania.*—J. S. Shaw has been appointed Roadmaster of the Rochester division, vice John A. Dickson, resigned. Mr. Shaw was formerly with the Richmond & Danville.

*Whitewater.*—At the annual meeting of the company held at Connersville, Ind., May 21, the following Board of Directors was elected: Joseph Ramsey, Jr., Robert L. Read, E. F. Osborn, J. C. Davie, B. S. Sutton, E. Rollins Moore, J. S. Fay, Jr., Robert Bacon and J. T. Linzee. The officers elected were: E. F. Osborn, President; J. C Davie, Secretary; George S. Russell, Treasurer; P. A. Hewitt, Auditor, and B. S. Sutton, Superintendent.

## RAILROAD CONSTRUCTION,

### Incorporations, Surveys, Etc.

**Alabama Midland.**—The road has been operated for some time between Montgomery and Bainbridge, Ga., 175 miles, by the contractors. The property was transferred last week to the railroad company and freight and passenger trains commenced running on a regular time-table between Montgomery and Bainbridge on May 21.

**Albany, Boston & Florida.**—This company has been recently organized in Georgia to build a road from Albany on the Central of Georgia southeasterly through Moultrie on the proposed extension of the Georgia Southern & Florida from Tiptonville, and thence to Boston, Ga., on the Savannah, Florida & Western. The capital stock is $50,000 and of this amount $40,000 has been subscribed in Boston.

**Anniston & Atlantic.**—The contract has been let to McDonald & Campbell, of Anniston, Ala., for the extension of this road from the present terminus at Sylacauga westerly to Shelby, Ala., near the Coosa River, a distance of about 20 miles.

**Atchison, Topeka & Santa Fe.**—A branch is being built from Ardmore, I. T., to some coal mines three or four miles distant, but it is not proposed to continue this line to Paris, Tex., as some of the local newspapers report.

It is stated that a survey has been recently made for a short line from Palmer Lake north to Table Rock, El Paso county, Colo., about 15 miles.

**Beaver & Ellwood.**—The charter for this company was filed in Pennsylvania last week. The capital stock is $50,000, and the company proposes to build a road in Western Pennsylvania about three miles long.

**Belleville, Centralia & Eastern.**—About 80 men are engaged in finishing the tracklaying on this road, and 150 men are surfacing. The tracklaying and surfacing are being done by the company's forces. Oliver Ferguson & Sons, of Bedford, Ind., had the contract for grading, but this work has been finished. There are four iron bridges having five spans, and aggregating 460 ft. J. E. Thomes, of Kansas City, has the contract for the bridges, and has 50 men working completing the structures. Since Jan. 1, 39 miles of track has been laid. The maximum grade on the line is 50 ft. per mile. The maximum curves are five degrees. The line is being built by the Louisville, Evansville & St. Louis Consolidated road from Mt. Vernon Junction, Ill., through Centralia to Belleville Junction, Ill., a total distance of 72 miles. This includes the seven miles of the track of the Jacksonville Southeastern Line, which is used. Thomas L. Dunn, New Albany, Ind., is Chief Engineer.

**Blue Mountain Mineral.**—Grading is making rapid progress on the section between Jacksonville and Anniston, Ala., and it is expected to complete the line between these points in a few weeks.

**Brierfield, Blockton & Birmingham.**—The following is a list of the sub-contractors working under Aldrich, Worthington & Co., of Birmingham, Ala., on the Bessemer branch of this road: Correll & Emonson, Siluria, Ala.; G. E. Jekyll & Co., D. A. Saunders, W. J. Sorrell & Son, Jekyll, George & Co., and M. McTighe & Co., all of Brock's Gap, Ala.; Reese Thomas, J. Curtis, and G. B. Edwards, of Bessemer, Ala.

**Bristol Belt.**—The following officers have been elected: B. L. Dulaney, President; H. E. McCay, Vice-President; A. B. Whiteaker, Secretary and Treasurer. Construction will begin on the line in 60 days. It will extend from Commonwealth avenue in Bristol, Tenn., to the Bristol Land Co.'s addition.

**Calgary & Edmonton.**—The officers state that the campany expects to complete 100 miles of the road from Calgary Alberta northwest this year. T. T. Bone, C. H. Mather and H. Norquay, who had charge of the surveying party on the division from Calgary north to the Red Deer River and Blind Man, have completed the survey, and report that they found a good line with few engineering difficulties. The Canadian Pacific has leased the line for a period of six years. A reconnoisance has been made by D. D. Mann, one of the contractors, over the entire line from Calgary, on the Canadian Pacific, north to Edmonton, Alberta, on the Saskatchewan River, and south to Ft. McLeod. Mr. Mann states that 18 long bridges will be necessary and that one will cost nearly $100,000. The total length of the line will be 300 miles. The first 40 miles from Calgary through the Lone River district is a good grazing country, and from there to the Red Deer River is a fine farming country. From the Red Deer to Battle River the country is a stock farming land. From Battle River to Edmonton is prairie, with numerous small streams. From Calgary south to High River is a farming country well settled for 20 miles. From High River to Macleod and to the boundary between the trail and the mountains is a fine ranching district. The country through which the line will extend is generally rolling and with numerous streams and timber tracts, so that the work of construction will be heavier than the average of prairie roads.

**Canadian Pacific.**—About 250 men are now engaged in the grading from Sproat's Landing near Revelstoke, B. C., south to to the Kootenai Lake; and thence to Nelson on the Columbia River, where connection will be made with the extension which is now being built by the Spokane Falls & Northern. It is expected that the line will be ready for operation in about three months.

**Chattanooga, Rome & Columbus.**—The contract for the proposed extension from the present terminus at Carrollton, Ga., south to Columbus, a distance of 80 miles, has been let to the Rome Brick Co. The grading of the extension will probably not be commenced for some time yet. The company has under consideration the re-location of its Chattanooga freight station, which if carried out, will necessitate the construction of several miles of new road near the city.

**Chesapeake & Ohio.**—Reynolds & Co. have secured the contract for building the double track from Clifton Forge to Lowmoor, Va.

**Chester, Lenoir & Southern.**—The line between Danlington, S. C., on the Atlantic Coast Line, and the Pee Dee River, a distance of about 10 miles, is being relocated by George W. Earle, Chief Engineer, and it is stated that when this work is finished the grading will be begun.

**Chicago, Lake Geneva & Pacific.**—Special elections were held in Fort Atkinson, Geneva Lake, Jefferson and Whitewater, Wis., last week to vote on the question of issuing bonds in aid of this road. The first three towns voted to issue bonds to the amount of $20,000 each, and Whitewater $30,000.

**Chicago, Milwaukee & St. Paul.**—The survey which the company is now making from Chamberlain, S. D., across the Sioux Indian Reservation is in accordance with the Act of Congress which grants the company the right of way for an extension through the reservation. No determination has yet been reached as to the time when the company will place the line under contract.

**Chicago, Portland & Wabash.**—The articles of incorporation of this company were filed in Indiana last week. The Company proposes to build across the State from a point near Portland to Hammond, in the northwestern part of the State, near Chicago.

**Chicago, Rock Island & Pacific.**—The extension of the Southwestern division has been completed from El Reno, I. T., the present terminus, south a distance of 15 miles to the north line of the Chickasaw Nation country. The bridge over the Canadian River will be over half a mile long.

**Chicago, St. Paul, Minneapolis & Omaha.**—The contractors have 200 men at work on the extension of the Goodyear, Neillsville & Northern from Marshfield to Neillsville, Wis., a distance of 23¼ miles. As stated last week, Shepard, Siems & Co., of St. Paul, Minn., have the contract. They are to complete the line early next fall. The maximum grade 0.8 per cent., and the maximum curve is three degrees There are no iron bridges or other difficult pieces of work.

**Clarksdale & Northeastern.**—This company has been recently chartered in Mississippi to build a road from Clarksdale northeast through Quitman County to Belen and thence to the Coldwater River, a distance of about 20 miles. The company has asked Quitman County to vote a subsidy of $50,000 for this division. When the line is completed to the Coldwater River it is proposed to extend it to Sardis, on the Illinois Central, and thence via Batesville, Oxford and New Albany to Corinth, in the northeastern part of the state.

**Columbia, Newbury & Laurens.**—The tracklaying has been completed to Prosperity, S. C., on the Columbia & Greenville division of the Richmond & Danville, a distance of 37 miles northwest of Columbia. The northern terminus of the road will be at Newberry, six miles northwest of Prosperity, but the track of the Richmond & Danville will probably be used between these points.

**Corpus Christi & South America.**—The survey is now in progress from Corpus Christi south to Brownsville, Tex., and it is stated that arrangements have been made to begin tracklaying as soon as the location has been made. The Fitzgerald & Mallory Construction Co. is understood to have the contract. The company has obtained a subsidy of $13,000 per mile from the Mexican government for an extension from Brownsville through Mexico to the north line of Guatemala. E. P. Ropes, of Corpus Christi, is President.

**Corsicana & Southeastern.**—The preliminary survey for this road, which it is proposed to build from Corsicana southwest about 50 miles to a point on the International & Great Northern has been completed to Fairfield, about 25 miles from Corsicana.

**Decatur, Chesapeake & New Orleans.**—It is stated that a new construction company has been recently formed to build this road and that it will begin grading early in June on the uncompleted portion of the road between Decatur and Shelbyville, Tenn.

**Delaware, Lackawanna & Western.**—The grading on the extension of the Passaic & Delaware division from Bernardsville, Somerset County, to Peapack, N. J., seven miles, is being pushed forward very rapidly at various points along the line. The route is as nearly direct as possible. To avoid a sharp curve at Peapack, a deep cut is being made, and the course of Peapack Creek will be changed and a new channel, deeper and broader than the old, is being dug. As already stated, C. F. Mairs, of Bernardsville, N. J., has the contract for grading.

**Duluth & Winnipeg.**—The company has purchased land at Grassey Point, Duluth, Minn., for ore docks and yards. The land is low in some places and will need considerable filling.

The town of Red Lake Falls has agreed to grant the company right of way for about 50 miles easterly from that place. The contractors expect to have the track laying completed from the present terminus at Grand Rapids through Red Lake Falls to the international boundary by Dec. 15 next. A party of engineers is now surveying the section from Winnipeg to the Lake of the Woods, a distance of about 80 miles.

**Dutchess County.**—Andrews & Warner, 202 Broadway, New York City, the principal contractors for this road, have let sub-contracts to T. T. Amory, with headquarters at Poughkeepsie, and E. D. Rice, with headquarters at Hopewell Junction, N. Y. The line extends from Poughkeepsie to Hopewell Junction, a distance of 12 miles, making connections with the Poughkeepsie bridge and its connecting roads. The surveys have been completed, and about one-third of the right of way has been secured. The grading will be started immediately. The work on the whole line is light, with very easy grades and curves; and it is expected that the track will be laid by September. J. C. Stanton, 35 Broadway, is General Manager.

**Easton & Philadelphia.**—This company has been chartered in Pennsylvania to build a road from a point in Easton along the west side of the Delaware River through Northampton and Berks counties to New Hope, a distance of about 32 miles. The capital stock is $1,000,000. Carroll R. Williams, Philadelphia, is President.

**Elmira, Cortland & Northern.**—It is stated that a preliminary survey will soon be made from the northern terminus at Camden, via Clayton or Morristown, on the St. Lawrence River, to Ogdensburg.

**Empire & Dublin.**—The locating survey for the extension from the Oconee River at Hawkinsville east to a connection with the Georgia Southern & Florida near Grovonia, will be begun in a few days. Three preliminary surveys have been made for the extension.

**Forest City & Sioux City.**—About 400 carloads of rails have arrived at Huron, S. D., for this road, and tracklaying will be commenced immediately on the 16 miles of graded road between Forest City and Gettysburg, S. D.

**Fort Scott & Eastern.**—Tracklaying on this extension of the Missouri Pacific was completed last week from Fort Scott, Kan., to Rich Hill, Mo., on the Lexington & Southern division, a distance of 24 miles. The road will be continued northeast through Appleton City to a point on the Warsaw branch of the Missouri Pacific, a distance of about 50 miles, and thence to Tipton, on the main line, a distance of about 120 miles from Fort Scott.

**Fort Worth & Albuquerque.**—The grading has been completed from Fort Worth northwest, across the Trinity River, for a distance of 12 miles, and is now in progress to Springtown in Parker County. Hurley, Tierney & Lynch, of Fort Worth, have the sub-contract for the grading of the first 30 miles.

**Grand Junction.**—The tracklaying has been completed for a distance of about 20 miles from Rifle Creek west to a point near Parachute, Col. Grading has been completed on the entire road to Grand Junction, 67 miles from Rifle Creek.

**Great Falls & Canada.**—The tracklaying on this road is progressing from Great Falls, Mont., north at the rate of two miles per day. Three hundred teams and 600 men are engaged in the construction work. About 60 miles of the grading has been finished, and the track has been laid for 15 miles. The bridging has been completed on the first 20 miles. The rails for completing the first 50 miles have arrived at Great Falls, and it is expected that the tracklaying will reach the Teton River this or next week. There are several Howe truss bridges crossing the Teton, Marias and Milk rivers. The road is being built from Great Falls north to the international boundary line at a point about 10 miles west of the West Butte of the Sweet Grass Hills, and thence northeastwardly to Lethbridge, Alberta, a distance of 198 miles. One hundred and thirty-three miles of the line will be in Montana. The contract for grading and tracklaying was let last January to Donald Grant & Co., of Great Falls, and grading was begun March 1. It is expected to have the road completed about Sept. 30. It crosses a rolling prairie country and the grading is about the average of prairie work. The maximum grade is 1 per cent. per 100 ft., and the maximum curves are 10 degrees, but there will be only a few of these, the curves being generally 1 to 3 degrees. The heaviest work will be at the crossing of the Teton and Marias rivers. All the financial arrangements have been made for building the entire line and equipping it. The road is being built by the Alberta Railway & Coal Co., to give it an outlet for its coal from the Lethbridge mines to the smelters at Great Falls, Helena, Butte and to other points in Montana. Donald Grant, of Faribault, Minn., is President, and W. D. Barclay, of Great Falls, is Chief Engineer.

**Great Northwest Central.**—This company invites subscriptions for £500,000 of five per cent. land grant mortgage bonds at 95 per cent. The capital is required to complete the construction of the line between Brandon and Peace River. The company has been asked to deflect its line to the north about 14 miles to reach Birtle, or to construct a branch to that point.

**Gulf, Shreveport & Kansas City.**—The Northwestern Construction Co. has been organized to build this road from the Louisiana state line near Texarkana, Tex., to Shreveport, La., and then south to some point on the Gulf of Mexico, near Sabine Pass. Grading was commenced last week at Shreveport. The engineers are completing the location north of that place.

**Harriman Belt.**—This road is being built by the Harriman Railway Construction Co., which has been organized for this purpose by the officers of the East Tennessee Land Co., of Harriman, Tenn. The capital stock is $100,000, of which $60,000 has been paid in. The company expects to build from 10 to 20 miles of track this year, including a belt line around the city of Harriman and branches to the mines of the East Tennessee Land Co. About one mile of track has now been laid. W. H. Russell is General Manager and J. P. Suverkrop is Chief Engineer, both of Harriman.

**Homer & Susquehanna.**—This company has been incorporated in Pennsylvania with a capital stock placed at $200,000 to build a road to extend from a point in Centre Township, Indiana County, at the town of Homer to a point on the Susquehanna River near Cherry Tree in the same county. The length of the road is 20 miles. J. M. Guthrie, Indiana, Pa., is President.

**Johnson City & Carolina.**—Purdy & Retford, of New York City, are the contractors for this road, referred to last week. Their headquarters will be at Johnson City, Tenn., and they are now letting subcontracts for the line from that point to Embreeville.

**Kansas City, Chattanooga, Augusta & Charleston.**—It is stated that the arrangements for building the first section of this road are about completed and that work will begin shortly on the Tennessee division. The line in Tennessee will commence at Chattanooga and extend through Shelbyville and Columbia and across the Tennessee River near the mouth of Duck River to the Kentucky state line, where connection will probably be made with the Mobile & Ohio.

**Kentucky Roads.**—Bills have been introduced in the State Legislature to incorporate the following roads: Paducah Metropolis & Ohio River; Parkland Belt & Riverside; Rockfield & Northern; West Point Belt Line. Bills have been passed incorporating the following roads: Greensburg & Glasgow; Louisville, Jellico & Somerset; Paducah, Metropolis & Ohio River; Cairo, Hickman & Memphis; Fordsville, Hartford & Western; Mount Sterling Connecting; Central Kentucky & Ohio River; Jellico & Cumberland Gap; Eminence & Drennon Springs; Kentucky Cannel Coal; Jellico & Beattyville, and the Louisville Belt Railway & Transfer Co.

**Lake Shore & Michigan Southern.**—The directors of the Indiana Northern, which was recently organized by ihe officers of this company, have ordered the survey to be commenced at once from Fremont through Orland and Lima, Ind., to a connection with the Sturgis, Goshen & St. Louis road now operated by this company. This line is through the townships north of Angola and La Grange, through which the Toledo & Western proposes to build.

**Macon & Atlantic.**—The Secretary of State of Georgia this week granted a charter to this company, which has been organized by the Macon Construction Co. to build a road 165 miles in length, from Soffkee, near Macon, on the Georgia Southern & Florida, to Savannah, with a branch line to some point on the Savannah River in Effingham County. The capital stock is $2,475,000.

**Macon & Birmingham.**—The tracklaying has been completed from Macon west about 20 miles to Culloden, Ga. Tracklaying is now being completed to a connection with the Atlanta & Florida, and to Woodbury, Ga., on the Georgia Midland & Gulf, 67 miles west of Macon.

**Macon & Dublin.**—The City Council of Macon, Ga., has granted the company the right of way through the city and grounds for stations and shops. Dudley Hughes, President of the road, claims that the grading will be resumed between Dublin and Macon, Ga., 55 miles, before July 1, and that the road will be in operation within 12 months. Forty miles of this distance west from Dublin was graded several years ago, and it is stated this can be repaired at but little expense. H. P. Morse, of Macon, is Vice-President.

**Manitoba & Southeastern.**—The directors have decided to begin a survey at once for the line between Winnipeg, Man., and the international boundary line at a point near the Lake of the Woods, about 80 miles. They have applied to the City Council of Winnipeg for the right to use the Louis Bridge for an entrance into the city.

**Massillon & Little Beaver.**—This company has been incorporated in Ohio with a capital stock of $1,000,000 to build a road from Massillon east to a point near the mouth of the Little Beaver Creek in Liverpool Township, Columbiana County, a distance of about 60 miles. It is stated that the line, when completed, will be operated by the Pennsylvania Company. The incorporators are: J. T. Brooks, H. G. Oliphant, L. L. Gilbert, J. J. Brooks and J. R. Casey.

**Metropolitan Southern.**—This company has been incorporated in Maryland by officers of the Baltimore & Ohio to build a road from Linden Station, on the Metropolitan branch of the Baltimore & Ohio, in Montgomery

County, to a point on the southern boundary of the state at or near Great Falls, on the Potomac River. The road will be about nine miles. A company will probably be chartered in Virginia to continue this line to a connection with the Virginia Midland, a distance of 20 miles. The capital stock of the Maryland company is $500,000.

**Mexican.**—Twelve miles of track have been completed on the Pachuca branch. The line is being laid with steel sleepers and heavy rails.

**Mexican International.**—It is stated that the company has under consideration an extension from its present terminus at Torrion, south to Durango, a distance of about 100 miles.

**Michigan Central.**—This company has accepted from the contractors 19 miles of the double track just completed between Grass Lake and Dexter, Mich., and five miles between Maidstone Cross and Essex Centre, Ont. Fifty-five miles of additional double track are now being constructed between the following points: Dutton to St. Clair Junction, Ont.; Yarmouth east to Springfield, Ont., and Cayuga to Welland, Ont.

**Missouri Pacific.**—Grading is in progress near Joplin, Mo., on the Joplin & Western road, which was recently incorporated in Missouri. The road is being built by the Missouri Pacific from Joplin in southwestern Missouri to a point on the St. Louis & San Francisco, near the east line of Jasper County.

**Missouri, Tennessee & Georgia.**—The town of Hickman, Ky., which is to be the Northern terminus of this road, has voted the company a subscription of $25,000.

**Monongahela & Chartiers.**—Articles of incorporation were filed last week in Pennsylvania by this company. It proposes to build from Blair's Station to Bridgeville, near the Monongahela River, at the mouth of Peters Creek, on the Chartiers Creek. The length of road will be 14 miles. The capital stock is $140,000. Henry Large, Jr., West Elizabeth, Pa., is President.

**Montana Central.**—Tracklaying on the Neihart branch has been completed from Allen, near Great Falls, Mont., southerly to Monarch, a distanch of 43 miles. This leaves 11 miles to complete the branch to Neihart, the southern terminus.

**Montana Western & Pacific.**—This company has been recently organized in Montana to build a line from Anaconda, on the Montana Union, westerly through Georgetown, Cable, Red Lion and Flint Creek, and other points in Deer Lodge County. William Thompson, of Butte, is one of the incorporators.

**Monterey & Mexican Gulf.**—It is stated that the company proposes to begin construction work at the southern or Tampico end, and push the grading north from that point to a junction with the line being built south from Victoria, which is about 246 miles from Venadito, the northern terminus. It is expected that the two lines will be connected in August.

**Mount Pleasant & Seaview City.**—It is stated that the entire issue of bonds has been negotiated in Europe and that the grading will be commenced at once between Hog Island and Seaview City, S. C., a distance of nine miles. J. P. Kennerly, of Charleston, is President.

**Nashville, Chattanooga & St. Louis.**—A meeting of the stockholders will be held in Nashville, Tenn., June 25, for the purpose of ratifying the purchase and authorizing the completion of the Tennessee & Cousa road; the construction of an extension of the Jasper branch from Dunlap to Pikeville or Crossville, Tenn., and the issuance of the company's first consolidated mortgage five per cent. bonds upon these extensions.

**New Albany Belt & Terminal.**—The Kentucky and Indiana Bridge Co. has acquired a controlling interest in this company and will guarantee an issue of first mortgage bonds. The location has been completed from New Albany, Ind., to a connection with the track of the Kentucky and Indiana Bridge Co., on the north side of the Ohio River. The grading will probably be commenced early in June. The property of the New Albany and Portland Ferry Co., has been purchased at a cost, it is stated, of $70,000. John McLeod, of Louisville, is Chief Engineer.

**New Roads.**—A preliminary survey has just been completed from Livingston north to Castle, Mont., about 50 miles, and a survey will soon be commenced for the line from Townsend on the Northern Pacific east to Castle and White Sulphur Springs. When the estimates have been made for these two lines it will be decided which line to build. D. E. Folsom and E. J. Anderson, of White Sulphur Springs, Mon., are interested in the project.

A company is being organized to survey and secure the right of way for a proposed road from Weiser, north through Weiser Cañon and along the Snake River to Lewiston, Mont.

A survey was commenced last week at Huntsville, Tex., on the International & Great Northern for a proposed road from that point Southwest about 30 miles to Anderson and Navasota. C. E. Wells, of Tyler, Tex., is Chief Engineer.

H. C. Hume is making a survey from Fenner, on the Atlantic & Pacific, Southwest a distance of about 30 miles to the Morongo Pass, near Beaumont on the Southern Pacific.

A survey is being made for a proposed road from Hot Springs, Southwest through Tines Creek to Waynesville, N. C, a distance of about 23 miles.

A company is being organized in North Dakota to build a road from Bismarck southeast to Ellendale, Dickey Co., and thence to a point in Brown Co., not yet decided.

The Egypt Coal Co., of Egypt, N. C., is having a survey made for a road from Egypt to Osgood, N. C., on the Raleigh & Augusta Air Line.

**New York, New Haven & Hartford.**—This company has under contract about 24 miles of double tracking between Madison and Niantic, Conn., on the Shore Line Division, which it expects to have completed and in operation by July 1. At present the grading has been completed on 20 miles of the section and the track has been laid on 15 miles. The tracklaying has practically all been done since Jan. 1. The number of iron bridges between Madison and Niantic is 13, the total length aggregating 525 ft. On the completion of the work now under construction, it is expected to place under contract about 13 additional miles between Niantic and New London and between Madison and Leete's Island, on the Shore Line Division. The plans for this work are now being prepared. The number of men at present working on the double tracking on the Shore Line is about 600. The work being done is expensive in some places, as the line has been changed to eliminate some of the curvature, and in these places the cuts are sometimes through rock to a depth of 40 ft.; the greater part of the road completed has been practically easy work. The maximum grades are 30 ft. and the curvature two degrees. The company has about four miles at present under contract on the New York Division for quadruple tracks, which it is intended to complete ready for tracklaying this fall. The number of men on this work is about 250.

**Norfolk & Western.**—Press despatches state that nearly 5,000 men are working on the 191 miles of the Ohio extension from Elkton, W. Va., to the Ohio River. Work is in progress on an 1,800 ft. tunnel from Laurel Creek to the headwaters of Twelve Pole River. The grading on the entire line is to be completed by January, but this tunnel may delay the final completion of the extension.

The directors have effected the sale of $2,000,000 of the first stock of the company to a syndicate at a price approximating the present market value, and by which the company will realize about $1,250,000. This plan was thought more advisable than an allotment to the stock holders. The proceeds obtained from the sale of the stock is to be used to complete the double tracking of several sections.

**Northern Pacific.**—Tracklaying is in progress on the extension of the Central Washington branch from Almira westerly to Grand Coulee on the Columbia River, a distance of about 30 miles. The grading has been finished on the entire line, and most of the bridges have been erected. The extension will probably be put in operation about July 1.

**Ogden & Hot Springs.**—Work was resumed last week on this road, which is to extend from Ogden north to Hot Springs, Utah, a distance of 10 miles. Some grading was done last November when the contract was let to H. W. Shurleff. A. H. Swan, of Ogden, is President.

**Oregonian.**—The contracts will be let at once for changing 62 miles of this road to standard gauge and entirely reconstructing it. The contracts will also be let at once for building extensions along the east and west sides of the Willamette Valley. The work will include one tunnel, 600 ft. long. C. N. Scott is General Superintendent and A. O. Eckelson is Chief Engineer, both of Portland, Ore.

**Paducah & Tennessee.**—Johnson Bros. & Faught, of Paducah, Ky., who have the contract for grading this road, will sublet 65 miles at once. The tracklaying will be done by T. J. Moss, of St Louis, who now owns the controlling interest in the property. The bridges and trestles will be erected by M. S. Cartter & Co., of St. Louis.

**Pajaro Valley.**—The contract for grading this road between Watsonville and Moss Landing, Cal., 12 miles, has been awarded to B. Mahon & Son.

**Philadelphia & Reading.**—A report is published stating that the right of way has been purchased by the company for a proposed branch about six miles long, about the city of Reading.

**Philadelphia & Sea Shore.**—The grading has been completed on the division from Winslow Junction on the Atlantic City road southeasterly to Sea Isle City, N. J., a distance of 34 miles. Tracklaying is in progress and about 16 miles have already been completed. The rails are being laid at the rate of about a mile a day. Nearly all the bridges have been erected, and the company expects to have the line in operation about July 1. The road has been built with light grade and few curves, and 70-lb. rails have been used. It is proposed to run through trains between Philadelphia and Sea Isle City, in connection with the Philadelphia & Reading, in 90 minutes, about 30 minutes faster than the present schedule. The distance is 58 miles, about nine miles shorter than the present route.

**Port Deposit.**—This company filed articles of incorporation in Maryland this week, changing the name of the Port Deposit & Columbia, which is controlled by the Pennsylvania, to the above. The capital stock is $300,000. The road extends from Columbia, Pa., to Port Deposit, Md., 40 miles.

**Quincy, Omaha & Kansas City.**—The President, in the annual report, recommends extending the line from Trenton, Mo., to Pattonsburg, there connecting with the Wabash. He also recommends extending from Quincy to Beardstown, Ill., securing an eastern outlet.

**Ravenswood, Spencer & Glenville.**—This road is projected to extend from a point on the Ohio River road at Ravenswood southeast through Jackson and Roane Counties to Spencer, W. Va., a distance of about 33 miles. It is intended to obtain the funds for building the line principally from county subscriptions and by issuing bonds endorsed by the Ohio River Road. It has not yet been decided when to begin construction.

**Rhinelander & Western.**—The surveys have been made for about seven miles from Rhinelander, Wis. The road is to extend from Rhinelander west to a connection with the Chicago, Milwaukee & St. Paul, south of Goodnow, a distance of about 14 miles. The contracts for grading and track-laying will be let to Henry & Balch, of Minneapolis, Minn., in August next. The route is through a dense pine forest, containing vast quantities of standing pine that is not accessible to driving streams. The company will construct in addition to the main line, a circuit or belt-line track around Boom Lake at Rhinelander, a distance of seven miles, to accommodate the saw mills to be built on the banks of Boom Lake. The lake, upon which the village of Rhinelander is situated, has a very large boomage capacity, and nine saw-mills are now located upon it. E. S. Shepard, of Rhinelander, is Chief Engineer.

**St. Albans & Coal River.**—This road is projected to extend from Charleston, through Boone and Logan, W. Va., to a point on the Ohio extension of the Norfolk & Western near the Kentucky state line, a distance of about 150 miles. Of this line only 15 miles have been located and one mile graded. The preliminary surveys have been completed for some distance further, but there is little prospect of any part of the road being completed this year. P. O'Hern is President, and W. C. Reynolds is Chief Engineer, both of Charleston, W. Va.

**St. Louis, Alton & Springfield.**—C. E. Kimball and W. B. Parsons, Jr., of New York City, the engineers of the syndicate which has recently taken the securities of the company, have been examining the property and making estimates for the proposed extension from Batesville north to Springfield, Ill., and for the proposed line from Alton to Venice.

The company has purchased a third interest in the Alton Levee track at Alton, Ill., heretofore jointly owned by the Chicago & Alton and Indianapolis & St. Louis roads.

**St. Louis, Grand Tower & Southern.**—The survey for this road has been completed from East St. Louis to Chester, Ill., and grading will probably be commenced in a few weeks. The company will use the Mississippi River levee from East St. Louis south to Ivy Landing, a distance of about 40 miles, as part of its road. This section will require but little grading.

**San Antonio & Aransas Pass.**—A second survey is being made for the extension from Kenedy southwest to Laredo, Tex., 135 miles. One preliminary survey has already been completed. It is not proposed, however, to begin construction work on this line until the first section of the extension from Houston to Alexandria, Ga., has been finished.

**Seattle & Montana.**—This company is organizing a party of engineers to survey from Seattle up the north fork of the Stillaguamish River in search of a pass; also across the pass on north fork to Sauk, and up that river to Ward pass. The officers hope to find a better pass than the Cady or Snoqualmie.

**Sioux Falls Terminal.**—Tracklaying is in progress on this road, and about 1½ miles of track has been laid this year. The route is from Sioux Falls to South Sioux Falls, S. D., and to stock yards at South Sioux Falls. The total length will be about seven miles. J. C. Barton, of Sioux Falls, is Chief Engineer.

**Stevenson, Sands Mountain & Dalton.**—The company last week filed a certificate of its organization with the Secretary of State, at Montgomery, Ala. The company proposes to build a road from Stevenson to Higdon, Ala., and thence to Dalton, Ga. The articles of incorporation were filed last October.

**Tacoma, Olympia, & Gray's Harbor.**—The articles of incorporation of this company, recently referred to as chartered to build branches of the Northern Pacific in Washington, provide for the construction of the following six lines: from a point in Lewis County on the Pacific division of the Northern Pacific, northwesterly to the Chehalis River, through the counties of Thurston and Chehalis, to the south side of Gray's harbor, near South bay; from a point on the Northern Pacific in Pierce County, westerly to Olympia, in Thurston County, thence down the Black River valley to a connection with the line down the Chehalis valley; from a point in Chehalis County, on the main line, near Montesano, north up the Wynooche River toward its source, a distance of 25 miles; from a point in Chehalis County near the head of Gray's harbor, up the Wiskan River, a distance of 20 miles; from Gray's harbor, along its north side to the mouth of the Humtulip River, and up that river in a northerly direction, a distance of 50 miles; from a point on this last branch at Hoquiam, up the Hoquiam River, a distance of 25 miles. The capital stock is $6,000,00.

Dickinson & King have been awarded the contract for building the division from Tacoma west to Gray's Harbor, Wash., a distance of about 106 miles. The line will leave the Pacific Division of the Northern Pacific at Lakeview, a few miles south of Tacoma.

**Tennessee Midland.**—Press dispatches from Nashville state that the company has about completed arrangements to finish the road from the Tennessee River to Nashville, a distance of 85 miles, and that grading will be resumed in June.

**Tennessee River, Dayton & Pikeville.**—This is the name of the road to be built from the Tenesssee River, near Dayton, to Pikeville, Tenn., by the Dayton Coal & Iron Co., and referred to under the latter title last week. The engineers of this company have completed the survey for the first six miles. It has not yet been decided when to begin grading.

**Texas & Pacific.**—The company has secured the graded roadbed of the Denison, Bonham & New Orleans, between Bonhan and Denison, Tex., and will at once complete the tracklaying on the 10 miles between Bells and Denison.

**Texas, Sabine Valley & Northwestern.**—Richard J. Evans, of Longview, Tex., Vice-President and General Manager of this road, advertises that the contracts will be let shortly for building an extension of this road from Carthage, Tex. southeast to Logansport, La., on the Houston, East & West Texas, a distance of 20 miles. Nelson S. Easton, 66 Broadway, New York City, is President.

**The Dalles, Goldendale & Northern.**—C. W. Brown, of Portland, Or., is making a survey for this road from Goldendale, Wash., southeast a distance of about 25 miles to a point on the north bank of the Columbia River opposite The Dalles, Or.

**Toledo & Ohio Central Extension.**—This company, formerly known as the Marietta Columbus & Northern, is building a line from Amesville station northwesterly to Newton, O., on the Kanawha & Michigan, a distance of 13 miles. The tracklaying has been completed for about half the distance, and it is expected that the line will be finished and in operation some time in August. The work is quite heavy and includes one tunnel 1,500 ft. long. When the extension is completed it will give a nearly direct line from Marietta to Columbus over the tracks of the Toledo & Ohio Central from Newton to Columbus. The latter road, however, has no connection with the company building the line. The Chief Engineer is C. E. Gard, of Marietta.

**Toronto, Hamilton & Buffalo.**—The company is petitioning the city of Hamilton, Ont., for permission to build a double-track tunnel under the cemetery at that town. The officers state that the eastern end of the tunnel will be 400 ft. north of Dundurn castle, and will connect the west end with the Brantford branch. It will be about 80 ft. from the surface of the ground, 1,050 ft. long, 26 ft. wide and 20 ft. deep.

**Tunnelton, Kingwood & Fairchance.**—A meeting of the stockholders of this company has been called to consider a proposed extension from Tunnelton, W. Va., south. The line now extends from Tunnelton to Kingwood, a distance of 11 miles.

**Vancouver, Northern & Alaska.**—Press dispatches from Ottawa, Ont., dated May 23, state that application will be made to Parliament at the next session for the passage of an act incorporating the Vancouver, Northern & Alaska Railway & Navigation Co., with power to build a road from Vancouver, or some point on Burrard Inlet, on the Fraser River, via Seymour Creek Valley, Pemberton Meadows, Chilcoten Plains and the head waters of the Fraser River, to a point on the Par-

snip or Peace River, with branches in a northeasterly direction to the Skeena and Stikeen Rivers to the boundary of Alaska.

**Weatherford, Mineral Wells & Northwestern.**—The contract for grading the road is understood to have been let and construction is to commence as soon as the right of way has been secured. The road is to be built from Weatherford to Mineral Wells, Tex., a distance of 21 miles. The maximum grades are 1.50 per cent., and the maximum curves are six degrees. The Equitable Mortgage Co., of 208 Broadway, New York City, is the trustee of the mortgage. G. M. Fouts, of Weatherford, is General Manager.

**West Virginia& Pittsburgh.**—A survey is now being made and right of way obtained for the section from Braxton to Addison and south through Webster County, W. Va.

## GENERAL RAILROAD NEWS.

**Carolina Central.**—The stockholders have authorized an issue of 19,500 shares of preferred stock to be issued in exchange for the present second and third mortgage bonds. The issue of second mortgage bonds is $1,200,000, and of third mortgage bonds $1,500,000. The former will be exchanged dollar for dollar, and the third mortgage bonds for 50 per cent. in preferred stock.

**French Broad Valley.**—The Central Trust Co., of New York City, has filed a deed of trust at Asheville, N. C., given by this company as security for an issue of bonds amounting to $1,500,000. The same company has also filed a deed of trust given by the Asheville & Bristol, to secure an issue of bonds to the amount of $1,000,000.

**Lake Shore & Michigan Southern.**—The Sturgis, Goshen & St. Louis road, extending from Goshen, Ind., to Sturgis, Mich., and that part of the Battle Creek & Sturgis extending from Sturgis to Findley, Mich., having been acquired by this company, the duties of its general officers have been extended over these lines and the roads will be operated as the Goshen & Michigan Branch.

**Macon & Birmingham.**—The company has filed for record in Georgia a mortgage made in favor of the New York Security & Trust Co., to secure bonds to be issued at the rate of $20,000 per mile on the road between Macon, Ga., and Birmingham, Ala., 180 miles, which is now under construction.

**Missouri, Kansas & Texas.**—At the recent annual meeting of stockholders the plan of reorganization known as the Olcott plan was approved by more than three-fourths of the stock voting The lease of the Kansas City & Pacific was also ratified.

**New York & New England.**—Judge Thayer, of the Superior Court, Hartford, Conn., has ordered service for contempt of court upon directors of the road, and the papers have been served on three of the directors. The charge is failing to comply with the terms of Judge Thayer's peremptory mandamus ordering the removal of the Hartford tracks at the Church street grade crossing in Hartford. The company has opposed this removal, as it would sever track connection with a considerable piece of land under the elevated platform of the new Union Station. The affair raises an interesting question of the respective powers of the federal and state courts. The original mandamus was issued on May 5. A stay was secured, and the matter was taken to the Supreme Court of the state, which refused to interfere. The stay was released, and a peremptory mandamus was issued on May 7. The following day Justice Blatchford, of the United States Supreme Court, granted a writ of error, and indorsed upon it that it should operate as a supersedeas. Relying upon this, the railroad company disregarded the mandamus of Judge Thayer, and his action is to determine whether the supersedeas constitutes a sufficient warrant for noncompliance with his peremptory order in the premises. The proceedings for the abolition of the grade crossing were originally taken under an act of the Connecticut Legislature, and it is claimed that the federal courts cannot properly interfere.

**Oregon & Transcontinental.**—The official announcement is made that the details of the plan of re-organization of the company have been definitely decided upon, and will be formally communicated to the annual meeting of stockholders on June 16. The company was organized in 1881 under the laws of Oregon, for the general purpose of constructing railroads, to secure harmony of action between the Northern Pacific and Oregon Railway & Navigation Companies, by purchasing a controlling interest in those corporations, and to furnish the means to build and equip branch lines of the Northern Pacific road. It is now proposed to organize a new company, whose business will not be confined to the building and management of railroads, but may include almost all financial enterprises. The old company has a capital stock of $40,000,000, and the new company will offer to exchange its stock share for share for the Oregon & Transcontinental stock. Assuming that the stockholders generally will make the exchange, the new company will have at its disposal an accumulation from surplus income and cash profits of over $2,000,000, available for distribution as dividends. It further has the prospect of contingent profits to an amount nearly as large, and will command such a current income from investments, and such a profitable business from assured connections with strong financial groups in this country and abroad, as to be able to pay dividends. Holders of three-quarters of the stock in the old company have signified a willingness to exchange their stock for that of the new company.

**Philadelphia & Reading.**—The statement of the operation of the railroad for the month of April, 1890, as compared with same month of 1889 is as follows:

| Traffic. | April, 1890. | April, 1889. | Increase. |
|---|---|---|---|
| Gross earnings | $1,676,996 | $1,381,5 5 | $295,471 |
| Gross exp., ex. rent & int. | 996,601 | 878,568 | 118,033 |
| Profit in operating | 680,395 | 502,957 | 177,438 |
| Profit from Dec. 1 to date | $2,950,841 | $2,577,645 | $373,196 |

**Pittsburgh, Shenango & Lake Erie.**—It is stated that owners of a majority of the securities of this company of the Shenango & Ailegheny road have placed them in the hands of a re-organization committee. It is the intention to extend the present line from Amasa Junction to Conneaut Harbor, a distance of 40 miles; but it is not certain when the line will be built.

**Rutland.**—At a meeting of the stockholders of the company, held in Rutland, Vt., May 26, the proposed lease of the road to the Delaware & Hudson Canal Co. was ratified.

**Utica & Black River.**—A mortgage for $2,000,000 in favor of the Central Trust Co., of New York City, has been filed in New York City. The bonds will be payable at three periods, $1,300,000 on Jan. 1, 1891; $500,000 Jan. 1, 1894, and $200,000 July 1, 1898. The mortgage is secured by the entire property of the road, which is now operated under a 99-year lease by the Rome, Watertown & Ogdensburg.

**West Virginia & Pittsburgh.**—The recent issue of $3,000,000 bonds, which was guaranteed by the Baltimore & Ohio, has been oversubscribed in London and New York City.

## TRAFFIC.

### Chicago Traffic Matters.

CHICAGO, May 28, 1890.

While the situation is on the surface apparently unchanged, it is evident that there is a strong undercurrent, and many of the managers are sanguine that the efforts which are being made to end the rate war will soon show good results. If the meeting in New York this week shall succeed in restoring harmony between the all-rail and the lake and rail lines, and prevent the spread of the demoralization east of here, there seems to be reasonable grounds for hope that the rates north and west may be restored soon.

The Joint Rate Committee of the Trunk Line, Central Traffic and Western Freight Associations have decided that the rule allowing a change in shipping directions or destination of through shipments, applies only to grain shipments.

The rate of $11, which was offered by some of the scalpers on New York tickets last week, was suddenly withdrawn after a meeting of the Central Traffic Committee held on Thursday. This may have been only a coincidence, however.

The Ogdensburg Lake line to Montreal recently took 100,000 bushels of export grain at 5¾ cents per bushel.

Lake and rail rates to Buffalo to-day are: 1¾ cents per bushel on corn and 1½ cents on oats.

A meeting of the committee on uniform classification has been called for June 18 at Niagara Hotel, Buffalo.

E. P. Ripley, ex-General Manager of the Burlington, leaves for New York to-day, and will sail the last of the week for Europe. He will remain abroad some six weeks. There is considerable speculation as to his successor. It is more than probable that eventually, W. F. Merrill, at present General Manager of the Hannibal & St. Joseph, will receive the appointment. In the meanwhile, Geo. B. Harris will assume the duties of that office in addition to those of Second Vice-President.

A rumor is current that E. P. Vining, of the St. Louis & San Francisco, will succeed J. F. Goddard as Third Vice President of the Atchison.

The Chicago & Grand Trunk put on its "Sea Side and White Mountains Special" for the season, June 25.

The Burlington, which had maintained an $8 rate first-class on passenger business from Omaha to Chicago, on Saturday reduced the rate to $5. The same rate will also apply from Omaha to Peoria. This company has also decided to sell round-trip tourist tickets between Omaha and Chicago for $6. On Monday the company announced the $5 single trip rate from Kansas City to Chicago. This is probably as low as this road will go, though it is rumored that scalpers sell tickets over the Burlington as low as over other lines.

The Rock Island has followed the plan of the Atchison and has given notice that it will, after June 12, decline to prorate with the roads east of the Missouri River on through shipments of grain from points west.

The Canadian Pacific, which takes Chicago traffic eastward over the Wabash (which uses the Chicago & Atlantic part way), has already got a large share of the dressed beef traffic to New England points, making the rates 45 cents per 100 lbs., as against 48 by the old lines.

*Wednesday evening.*—An agreement has been consummated to-day which is the first decisive step toward a restoration of rates and of harmony between the Western lines. The agreement provides that passenger rates shall be restored as soon as can legally be done, that tariff rates shall be strictly maintained and steps taken toward the re-establishment of a passenger association as soon as possible. It received the final signatures in New York to-day, and is signed by all the Western lines between Chicago and the Rocky Mountains, including the Wisconsin Central and the Chicago, Milwaukee & St. Paul.

### Traffic Notes.

It has come to be an open secret that one of the weaker trunk lines is paying very high commissions on Chicago tickets. It is believed to be $3 or $4. A New York paper says that it is well known that several of the roads pay commissions secretly through the brokers.

A Philadelphia newspaper states that the through train of the Poughkeepsie Bridge route from Harrisburg to Boston came to grief on its first trip, the Pennsylvania refusing to allow it to run over its tracks between Phillipsburgh, N. J., and Belvidere.

A Western paper says that the Detroit, Grand Haven & Milwaukee has decided to disobey the Inter state Commerce Commission's recent decision requiring it to cease the free cartage of freight at Grand Rapids unless it adopts the same at Ionia, an intermediate station.

The managing officers of the Pennsylvania have directed General Passenger Agent Ford to announce that special trains for Sunday excursions will not be run over any portion of the Pennsylvania lines. Neither will Sunday excursion tickets be sold for regular trains on any part of either system at less than week-day rates.

At a meeting of the trunk line executive committee and representatives of the principal lake steamship lines, in New York on Tuesday, unanimous approval was given to a resolution ordering the restoration of west bound all-rail rates to the tariff on June 2, and the restoration of west-bound rail and lake rates on June 9. This statement concerning rail rates refers, we suppose, to the "Soo" lines, the old lines not having made any important reductions. It is understood that the Lake Superior boat lines agree to maintain rates on a basis of 71 cents first-class New York to St. Paul.

Passenger travel between Chicago and Missouri River points, between Kansas City and Omaha, between Kansas City and St. Louis, and between Denver and Eastern points has been very heavy in consequence of the low fares. At the Kansas City union station the crowds were so large that they were handled with difficulty. A Denver paper says that the Atchison, Topeka & Santa Fe sold 600 tickets from that city to Kansas City and Chicago in one day. The Saturday, Sunday and Monday trains are especially heavy. Denver papers report that 1,000 people arrived in that city from the east in 4½ hours on Saturday last. They claim that there are a good many gamblers and thieves among the arrivals. Extra trains were run by the Chicago & Alton, Missouri Pacific and Wabash out of Kansas City.

### The Interstate Commerce Commission.

The Interstate Commerce Commission, in an opinion by Commissioner Schoonmaker, has decided the case of Lehmann, Higginson & Co., of Humboldt, Kan., against the Transcontinental lines. Complaint was made of unjust discrimination in the rate on refined sugar in carloads, which was 65 cents per 100 lbs. from San Francisco to Kansas City, Mo., and 85 cents from San Francisco to Humboldt, more than 100 miles shorter distance, but not on the through line to Kansas City. The Commission holds that the lower rate to Kansas City is forced on the carriers by competitive conditions beyond their control, and the rate to Humboldt from San Francisco not being unreasonable in itself, but lower than it would be except for these competitive conditions at Kansas City, and is not appearing that substantial injustice results from the higher rate to Humboldt, this rate and the lower one to Kansas City are not found to be in contravention of the statute.

### The Interstate Commerce Law.

Senator Dawes, of Massachusetts, has introduced in the United States Senate a bill to amend the Interstate Commerce law by the insertion of the following: "Agreements to apportion the carriage of competitive traffic, for the purpose of enabling each competing line to carry a reasonable share of such traffic, may be entered into by common carriers, subject to the provisions of this act, and shall be lawful between the parties thereto; but this provision shall not be construed to release such common carriers from other provisions of this act; nor to affect the jurisdiction of the commission and the courts affected by this act; nor to permit the diversion of traffic routed or consigned by a shipper over any specified line. A copy of every such agreement shall be forthwith filed with the Interstate Commission, which shall have power to modify or annul the same, after a hearing upon notice to the parties, if the results of its operation are found to be in contravention of any of the provisions of this act."

The House Committee on Commerce has directed a favorable report to be made on the bill amending the Interstate commerce law so as to permit railroads to give reduced rates to veterans attending national encampments, with an amendment extending the same privileges to veteran Confederate soldiers.

### Decision by the Iowa Railroad Commissioners.

The Iowa Railroad Commissioners have decided the case of the Burlington Jobbers vs. The Burlington, Cedar Rapids & Northern in favor of the plaintiffs. They find that the respondent company has voluntarily put into effect class A rates on interstate shipments while it charges on State shipments class B rates. This caused a discrimination against Burlington shippers and in favor of shippers in St, Louis and other points outside the State of nearly 50 per cent. The Commissioners order the company to at once so adjust its tariff in Iowa as to remove any such discriminations, and they lay down this general rule:

When the interstate rates of any of the railways running into Iowa are lower from points without the State to points within the State than the local rates within the State to the same points on the same line of railroad, such discriminations are illegal and contrary to public policy, and are hereby forbidden.

### Lake and Rail Comparisons.

The first fleet out of Chicago this spring carried 3,000,000 bushels of grain, the capacity of 200 trains of 25 cars each [estimating 33,600 lbs. per car], which no one railroad could handle, in addition to regular traffic, within one month. And yet all this fleet reached Buffalo within from five to eight days. Almost 15,000,000 bushels of grain was carried from Chicago to the foot of Lake Erie during April. Nearly 1,479,955 bushels of grain went out of Duluth within one week from the opening of navigation. Lake Superior mines during the opening month sent 245,573 gross tons of ore to Ohio ports. During April from the Saginaw Valley was floated 37,693,000 ft. of lumber, 6,088,000 shingles and 366,000 lath on lake vessels. The nine main eastern and central trunk lines have 113,663 box cars, including line equipment. Counting the capacity at 40,000 lbs. each, the total would be 2,273,260 tons. As 154,716 tons, average, of lake cargo passed Detroit each day of open navigation in 1889, it is seen that these great railroad systems would have to load, move and unload their entire equipment every 14 days in order to handle the cargoes transported on these inland waters. The entire car room of the Lake Shore and Nickel Plate would have to be filled and moved from Chicago to Buffalo twice in order to carry the grain that has been shipped by lake between those two ports during the month of April.—*Marine Review.*

### East-bound Shipments.

The shipments of east-bound freight from Chicago by all the lines for the week ending Saturday, May 24, amounted to 56,213 tons, against 62,902 tons during the preceding week, a decrease of 6,689 tons, and against 41,198 tons during the corresponding week of 1889, an increase of 15,015 tons. The proportions carried by each road were:

| | W'k to May 24. | | W'k to May 17. | |
|---|---|---|---|---|
| | Tons. | P. c. | Tons. | P. c. |
| Michigan Central | 6,127 | 10.8 | 7,068 | 11.2 |
| Wabash | 2,905 | 5.5 | 1,812 | 2.9 |
| Lake Shore & Michigan South. | 10,948 | 19.5 | 9,341 | 14.8 |
| Pitts., Ft. Wayne & Chicago | 6,252 | 11.1 | 5,899 | 9.4 |
| Chicago, St. Louis & Pitts | 7,272 | 12.9 | 10,426 | 16.6 |
| Baltimore & Ohio | 4,715 | 8.4 | 5,824 | 9 3 |
| Chicago & Grand Trunk | 5,768 | 10 2 | 8,463 | 10.3 |
| New York, Chic. & St. Louis | 6,328 | 11.2 | 8,640 | 13.7 |
| Chicago & Atlantic | 5,868 | 10.4 | 7,419 | 11.8 |
| Total | 56,213 | 100 0 | 62,902 | 100.0 |

Of the above shipments 1,292 tons were flour, 23,852 tons grain, 2,266 tons millstuffs, 4,921 tons cured meats, 1,160 tons lard, 10,069 tons dressed beef, 1,728 tons butter, 1,363 tons hides, 326 tons wool and 7,242 tons lumber. The three Vanderbilt lines carried 41.5 per cent. of all the business, while the two Pennsylvania lines carried but 24.0 per cent.